

**YAMAHA**

**YFM250XL(C)**

**SERVICE MANUAL**

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**YFM250XL  
SERVICE MANUAL**

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**First Edition, February 1998**

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## NOTICE

This manual was produced by the Yamaha Motor Company primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual, so it is assumed that anyone who uses this book to perform maintenance and repairs on Yamaha machine has a basic understanding of the mechanical ideas and the procedures of machine repair. Repairs attempted by anyone without this knowledge are likely to render the machine unsafe and unfit for use.

Yamaha Motor Company, Ltd. is continually striving to improve all its models. Modifications and significant changes in specifications or procedures will be forwarded to all authorized Yamaha dealers and will appear in future editions of this manual where applicable.

**NOTE:**

Designs and specifications are subject to change without notice.

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## IMPORTANT INFORMATION

Particularly important information is distinguished in this manual by the following notations.



The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!



Failure to follow WARNING instructions could result in severe injury or death to the machine operator, a bystander or a person inspecting or repairing the machine.



A CAUTION indicates special precautions that must be taken to avoid damage to the machine.

**NOTE:**

A NOTE provides key information to make procedures easier or clearer.

# HOW TO USE THIS MANUAL

## MANUAL ORGANIZATION

This manual is intended as a handy, easy-to-read reference book for the mechanic. It is divided into chapters, sections and sub-sections. Comprehensive explanations of all installation, removal, disassembly, assembly, repair and inspection procedures are laid out with the individual steps in sequential order.

## PAGE FEATURES

The circled numbers below refer to the features indicated in the sample page.

① : An abbreviation and symbol in the upper right corner of each page indicates the current chapter.

② : The current section title is shown at the top of each page.†

③ : Sub-section titles appear in smaller print than the section title.†

④ : Lines of asterisks (\*) mark the beginning and end of a particularly important procedure. The steps of such procedures are marked with bullets (•).

⑤ : Important information such as fluids, special tools and torques are framed and marked with a corresponding symbol.

⑥ : A circled number refers to an illustrated part.

⑦ : A circled lower case letter refers to an illustrated dimension or alignment mark.

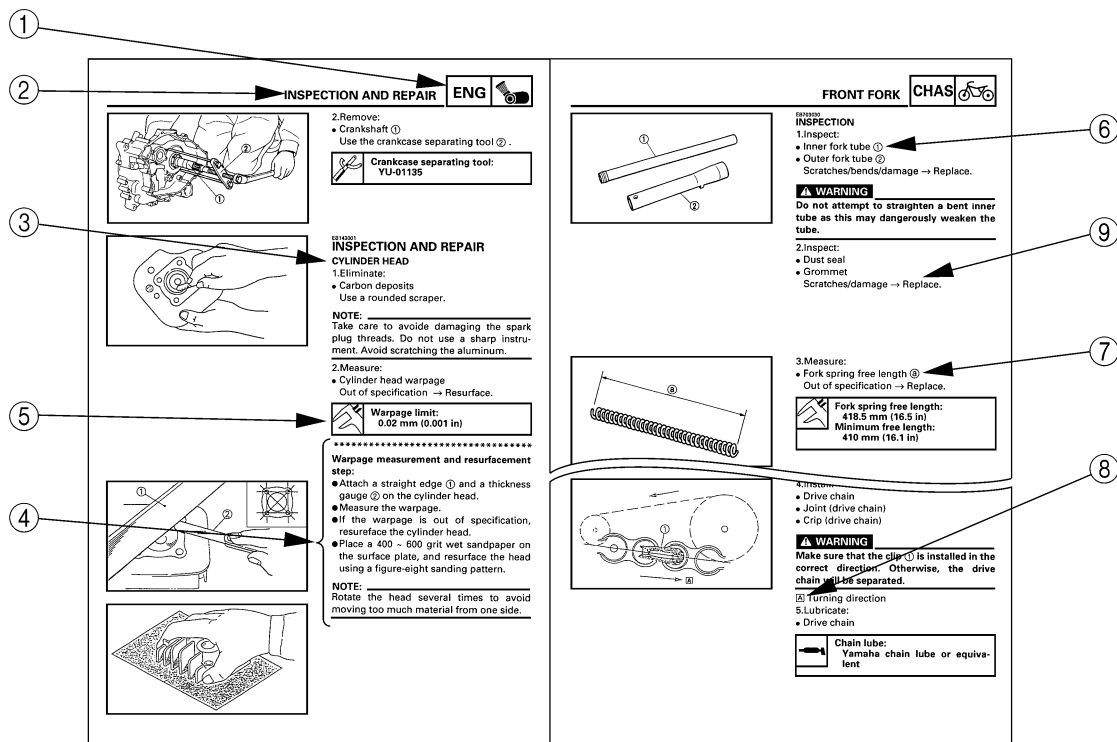
⑧ : An upper case letter in a box refers to other illustrated details.

⑨ : An arrow mark after a given defect suggests the recommended course of action.

† : In Chapter 3, "Periodic Inspection and Adjustment", it is usually the current sub-section title that appears at the top of each page, instead of the current section title.

## EXPLODED DIAGRAMS

To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each disassembly section.






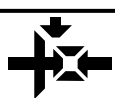




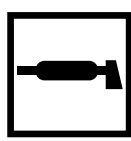

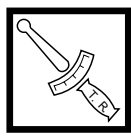


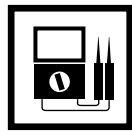











## ILLUSTRATED SYMBOLS

Illustrated symbols ① to ⑨ are printed on the top right of each page and indicate the subject of each chapter.

- ① General information
- ② Specifications
- ③ Periodic inspections and adjustments
- ④ Engine
- ⑤ Carburetion
- ⑥ Drive train
- ⑦ Chassis
- ⑧ Electrical
- ⑨ Troubleshooting

① GEN INFO 	② SPEC 	
③ INSP ADJ 	④ ENG 	
⑤ CARB 	⑥ DRIV 	
⑦ CHAS 	⑧ ELEC 	
⑨ TRBL SHTG 	⑩ 	
⑪ 	⑫ 	
⑬ 	⑭ 	
⑮ 	⑯ 	
⑰ 	⑱ 	⑲ 
⑳ 	㉑ 	㉒ 
㉓ 	㉔ New	

Illustrated symbols ⑩ to ⑯ are used to identify the specifications appearing in the text.

- ⑩ Filling fluid
- ⑪ Lubricant
- ⑫ Special tool
- ⑬ Torque
- ⑭ Wear limit, clearance
- ⑮ Engine speed
- ⑯  $\Omega$ , V, A








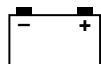

Illustrated symbols ⑰ to ㉒ in the exploded diagrams indicate the types of lubricants and lubrication points.

- ⑰ Apply engine oil
- ⑱ Apply gear oil
- ⑲ Apply molybdenum disulfide oil
- ⑳ Apply wheel bearing grease
- ㉑ Apply lightweight lithium-soap base grease
- ㉒ Apply molybdenum disulfide grease

Illustrated symbols ㉓ to ㉔ in the exploded diagrams indicate where to apply a locking agent ㉓ and when to install a new part ㉔.

- ㉓ Apply the locking agent (LOCTITE®)
- ㉔ Replace

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**GEN  
INFO**

**1**



**SPEC**

**2**



**INSP  
ADJ**

**3**



**ENG**

**4**



**CARB**

**5**



**DRIVE**

**6**



**CHAS**

**7**



**ELEC**

**8**



**TRBL  
SHTG**

**9**



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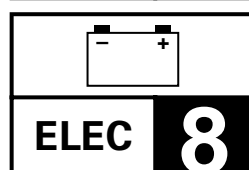
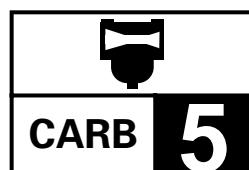
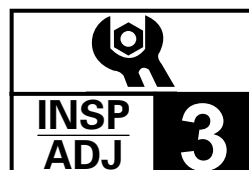
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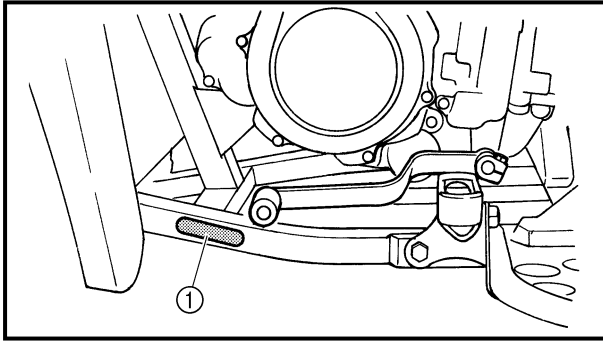
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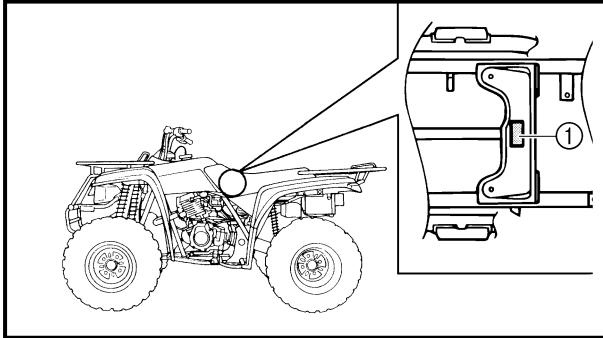
## GENERAL INFORMATION

### MACHINE IDENTIFICATION

#### VEHICLE IDENTIFICATION NUMBER

The vehicle identification number ① is stamped into the left side of the frame.

1



#### MODEL LABEL

The model label ① is affixed to the frame. This information will be needed to order spare parts.

EB101000

## IMPORTANT INFORMATION

### PREPARATION FOR REMOVAL

#### PROCEDURES

1. Remove all dirt, mud, dust and foreign material before removal and disassembly.
2. Use proper tools and cleaning equipment. Refer to the "SPECIAL TOOLS" section.
3. When disassembling the machine, always keep mated parts together. This includes gears, cylinder, piston and other parts that have been "mated" through normal wear. Mated parts must always be reused or replaced as an assembly.
4. During machine disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.

EB101010

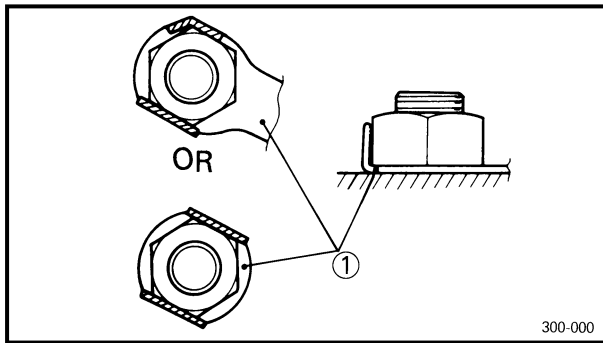
### REPLACEMENT PARTS

1. Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.

EB101020

### GASKETS, OIL SEALS AND O-RINGS

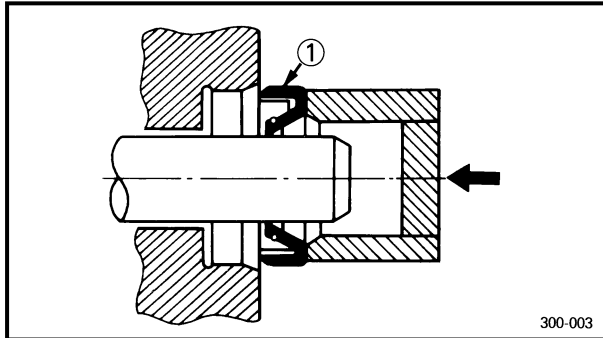
1. Replace all gaskets, seals and O-rings when overhauling the engine. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. Properly oil all mating parts and bearings during reassembly. Apply grease to the oil seal lips.



EB101030

## LOCK WASHERS/PLATES AND COTTER PINS

1. Replace all lock washers/plates ① and cotter pins after removal. Bend lock tabs along the bolt or nut flats after the bolt or nut has been tightened to specification.



EB101040

## BEARINGS AND OIL SEALS

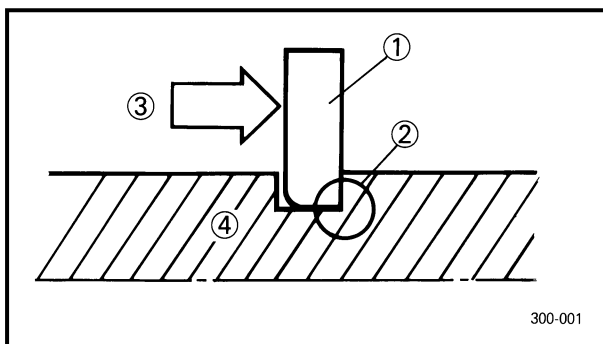
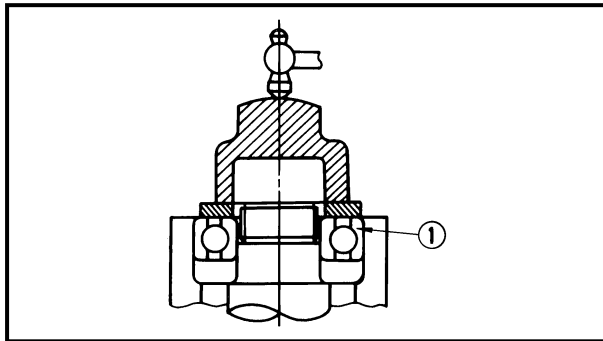
1. Install bearings and oil seals so that the manufacturer's marks or numbers are visible. When installing oil seals, apply a light coating of lightweight lithium base grease to the seal lips. Oil bearings liberally when installing, if appropriate.

① Oil seal

### CAUTION:

**Do not use compressed air to spin the bearings dry. This will damage the bearing surfaces.**

① Bearing

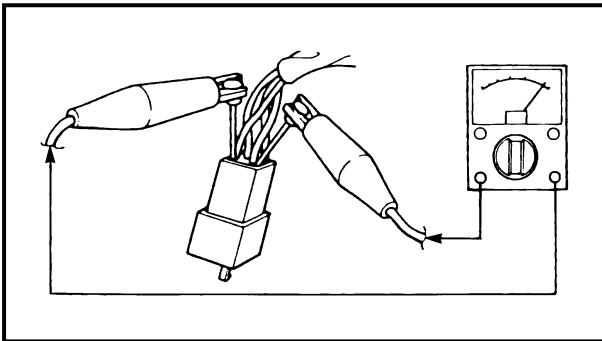
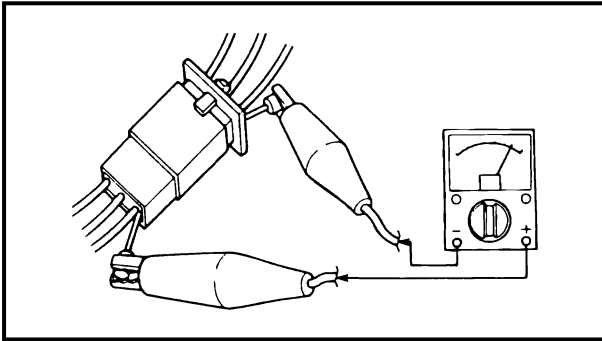
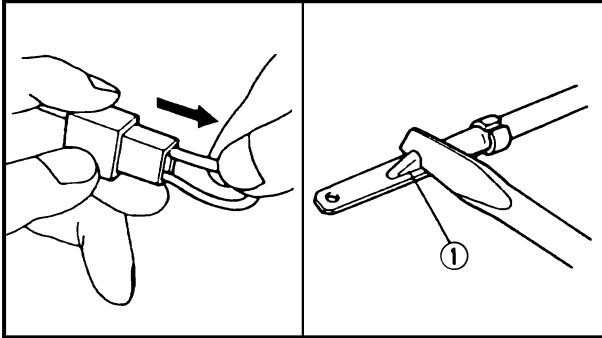
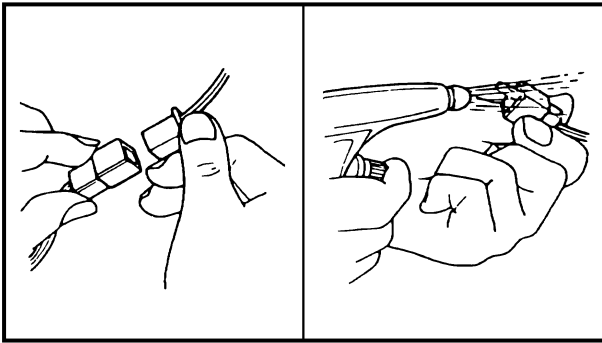


EB101050

## CIRCLIPS

1. Check all circlips carefully before reassembly. Always replace piston pin clips after one use. Replace distorted circlips. When installing a circlip ①, make sure that the sharp-edged corner ② is positioned opposite the thrust ③ it receives. See sectional view.

④ Shaft



EB801000

**CHECKING OF CONNECTIONS**

Check the connectors for stains, rust, moisture, etc.

**1.Disconnect:**

- Connector

**2.Check:**

- Connector

Moisture → Dry each terminal with an air blower.

Stains/rust → Connect and disconnect the terminals several times.

**3.Check:**

- Connector leads

Looseness → Bend up the pin ① and connect the terminals.

**4.Connect:**

- Connector terminals

**NOTE:**

The two terminals “click” together.

**5.Check:**

- Continuity (using a pocket tester)

**NOTE:**

- If there is no continuity, clean the terminals.
- When checking the wire harness be sure to perform steps 1 to 3.
- As a quick remedy, use a contact revitalizer available at most part stores.
- Check the connector with a pocket tester as shown.

EB102001

## SPECIAL TOOLS

The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools; this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools may differ by shape and part number from country to country. In such a case, two types are provided. When placing an order, refer to the list provided below to avoid any mistakes.

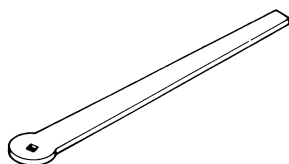
For US and CDN  
P/N. YM-, YU-, YS-, YK-, ACC-

Except for US and CDN  
P/N. 90890-

### FOR TUNE UP

1-B

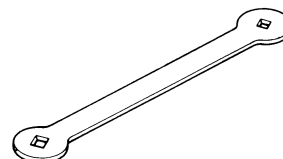
Valve adjusting tool 3mm (0.12 in)  
P/N. 90890-01311



This tool is necessary for adjusting the valve clearance.

1-A

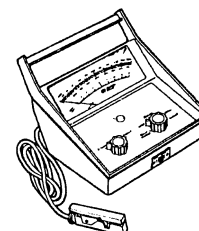
Valve adjusting tool 3mm (0.12 in)  
P/N. YM-08035



This tool is necessary for adjusting the valve clearance.

2-A

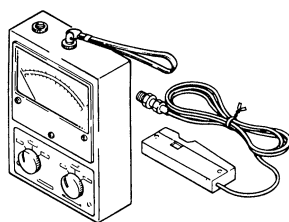
Inductive tachometer  
P/N. YU-8036-A



This tool is needed to measure engine rpm.

2-B

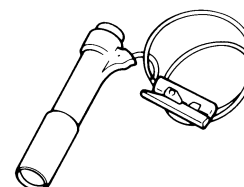
Engine tachometer  
P/N. 90890-03113



This tool is needed to measure engine rpm.

3-A

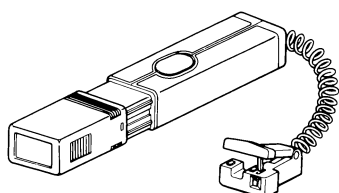
Timing light  
P/N. YM-33277-A



This tool is necessary for checking ignition timing.

3-B

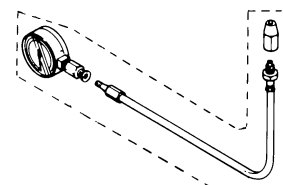
Timing light  
P/N. 90890-03141



This tool is necessary for checking ignition timing.

4-A

Compression gauge  
P/N. YU-33223  
Adapter (M12)  
P/N. YU-33223-3

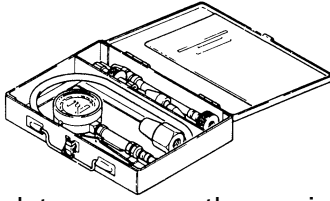


These gauge are used to measure the engine compression.



4-B

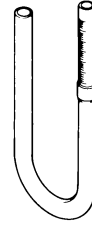
Compression gauge  
P/N. 90890-03081  
Extension  
P/N. 90890-04082



This gauge is used to measure the engine compression.

5

Fuel level gauge  
P/N. YM-01312-A  
P/N. 90890-01312

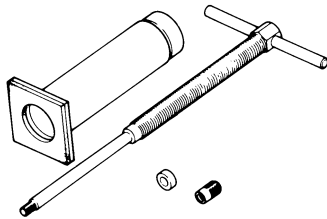


This gauge is used to measure the fuel level in the float chamber.

## FOR ENGINE SERVICE

2

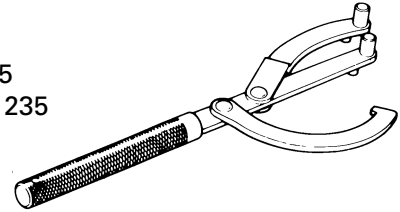
Piston pin puller  
P/N. YU-01304  
P/N. 90890-01304



This tool is used to remove the piston pin.

1

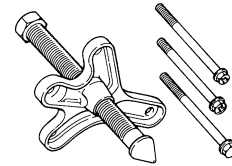
Rotor holder  
P/N. YU-01235  
P/N. 90890-01235



This tool is used to hold the starter pulley and clutch when removing or installing the starter pulley and clutch boss securing nut.

3-A

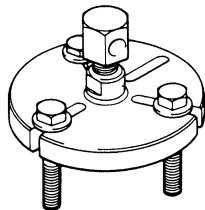
Flywheel puller  
P/N. YU-33270



This tool is used to remove the flywheel magnet rotor.

3-B

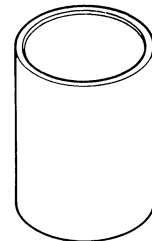
Flywheel puller  
P/N. 90890-01362



This tool is used to remove the flywheel magnet rotor.

4

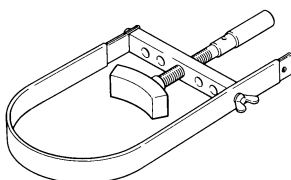
Flywheel puller attachment  
P/N. YM-33278  
P/N. 90890-04087



This tool is used to remove the flywheel magnet rotor and crankcase.

5

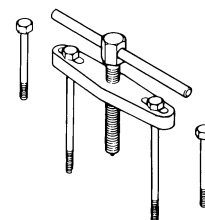
Sheave holder  
P/N. YS-01880  
P/N. 90890-01701



This tool is used to hold the flywheel magnet rotor when removing or installing the rotor securing nut.

6

Crankcase separating tool  
P/N. YU-01135-A  
P/N. 90890-01135



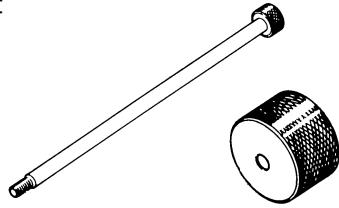
This tool is used when separating the crankcase.





7-A

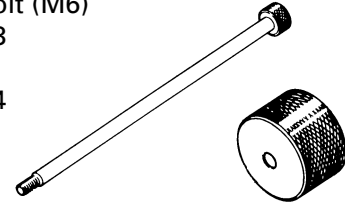
Slide hammer set  
P/N. YU-01083-A



These tools are used when removing the rocker arm shaft.

7-B

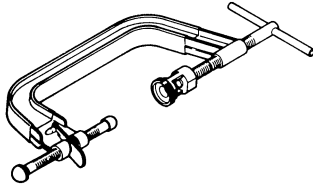
Slide hammer bolt (M6)  
P/N. 90890-01083  
Weight  
P/N. 90890-01084



These tools are used when removing the rocker arm shaft.

8

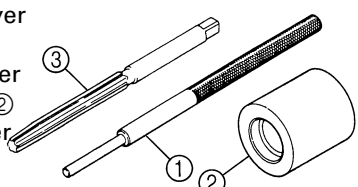
Valve spring compressor  
P/N. YM-04019  
P/N. 90890-04019



This tool is used to remove and install the valve assemblies.

9-A

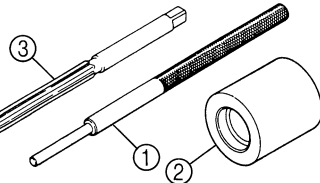
Valve guide remover and installer 6mm (0.24 in)  
Valve guide remover  
P/N. YM-4064-A-①  
Valve guide installer  
P/N. YM-04065-A-②  
Valve guide reamer  
P/N. YM-04066-③



These tools are used to remove, install and rebore the valve guide.

9-B

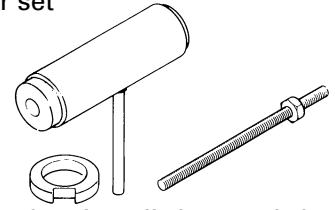
Valve guide remover and installer set  
6mm (0.24 in)  
Valve guide remover  
P/N. 90890-04064-①  
Valve guide installer  
P/N. 90890-04065-②  
Valve guide reamer  
P/N. 90890-04066-③



These tools are used to remove, install and rebore the valve guide.

10-A

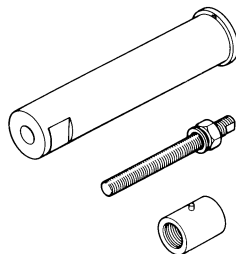
Crankshaft installer set  
P/N. YU-90050



These tools are used to install the crankshaft and balancer drive gear.

10-B

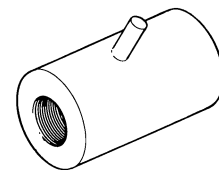
Buffer boss installer set  
P/N. 90890-04088



These tools are used to install the crankshaft and balancer drive gear.

11

Adapter #11  
P/N. YM-33279



This tool is used to install the crankshaft and balancer drive gear.

12-A

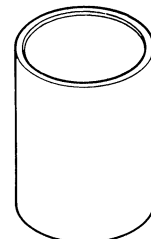
Pot spacer  
P/N. YM-90070-A



This tool is used to install the crankshaft and balancer drive gear.

12-B

Crankshaft spacer  
P/N. 90890-04060

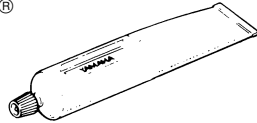


This tool is used to install the crankshaft and balancer drive gear.



13

Sealant (Quick Gasket<sup>®</sup>)  
P/N. ACC-QUICK-GS-KT  
YAMAHA bond No. 1215<sup>®</sup>  
P/N. 90890-85505

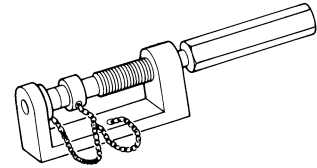


This sealant (bond) is used for crankcase mating surface, etc.

## FOR DRIVE TRAIN SERVICE

1-A

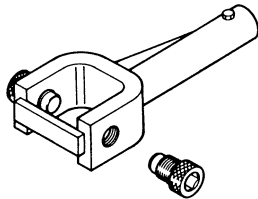
Universal joint holder  
P/N. YM-04062  
Attachment  
P/N. YM-33291



These tools are used to remove and install the universal joint.

1-B

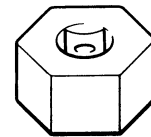
Universal joint holder  
P/N. 90890-04062  
Attachment  
P/N. 90890-04096



These tools are used to remove and install the universal joint.

2

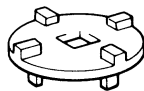
Bearing retainer wrench  
P/N. YM-33289  
P/N. 90890-04104



This tool is used to disassemble and reassemble the bearing.

3

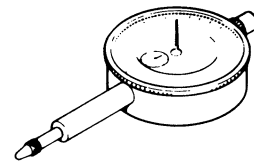
Ring nut wrench  
P/N. YM-1391  
P/N. 90890-01391



This tool is used to remove and install the reverse gear.

4

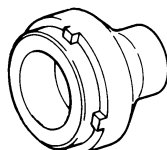
Dial gauge  
P/N. YM-03097  
P/N. 90890-03097



This tool is used to measure the gear lash for the middle gear and final gear.

5

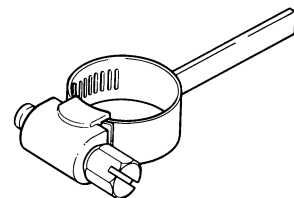
Bearing retainer wrench  
P/N. YM-04050  
P/N. 90890-04050



This tool is used to remove and install the final gear bearing retainer.

6

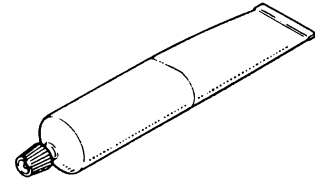
Gear lash measurement tool  
P/N. YM-01231  
P/N. 90890-01231



This tool is used to measure the gear lash.

**FOR CHASSIS SERVICE****1**

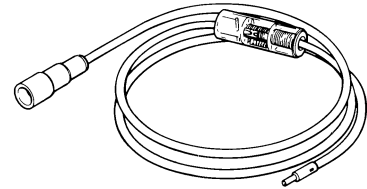
Yamaha brake grease  
P/N. 90793-40003



This Yamaha brake grease is used for rear brake dust seal.

**FOR ELECTRICAL COMPONENTS****1-A**

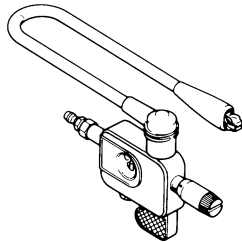
Dynamic spark tester  
P/N. YM-34487



This instrument is necessary for checking the ignition system components.

**1-B**

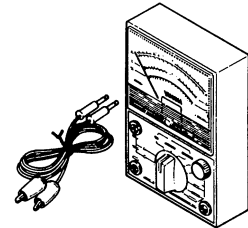
Ignition checker  
P/N. 90890-06754



This instrument is necessary for checking the ignition system components.

**2**

Pocket tester  
P/N. YU-03112  
P/N. 90890-03112



This instrument is invaluable for checking the electrical system.

**1**





## SPECIFICATIONS

## GENERAL SPECIFICATIONS

Item	Standard
Model code:	4XE1 (USA) 4XE2 (CAL) 4XE3 (CDN)
Dimensions:	
Overall length	1,940 mm (76.4 in)
Overall width	1,005 mm (39.6 in)
Overall height	1,118 mm (44.0 in)
Seat height	780 mm (30.7 in)
Wheelbase	1,170 mm (46.1 in)
Minimum ground clearance	155 mm (6.1 in)
Minimum turning radius	2,900 mm (114 in)
Basic weight:	
With oil and full fuel tank	215 kg (474 lb)
Engine:	
Engine type	Air-cooled 4-stroke, SOHC
Cylinder arrangement	Forward-inclined single cylinder
Displacement	229.6 cm <sup>3</sup>
Bore × stroke	71 × 58 mm (2.795 × 2.283 in)
Compression ratio	8.7 : 1
Compression pressure	900 kPa (9.0 kg/cm <sup>2</sup> , 128 psi)
Starting system	Electric and recoil starter
Lubrication system:	Wet sump
Oil type or grade:	
Engine oil	
Final gear oil	SAE80API "GL-4" Hypoid Gear Oil
Oil capacity:	
Engine oil	
Periodic oil change	1.5 L (1.3 Imp qt, 1.6 US qt)
With oil filter replacement	1.6 L (1.4 Imp qt, 1.7 US qt)
Total amount	1.8 L (1.6 Imp qt, 1.9 US qt)
Final gear case oil	
Periodic oil change	0.25 L (0.21 Imp qt, 0.27 US qt)
Total amount	0.27 L (0.24 Imp qt, 0.29 US qt)
Air filter:	Dry type element



Item		Standard
Fuel:		
Type		Unleaded fuel
Fuel tank capacity		12 L (2.64 Imp gal, 3.17 US gal)
Fuel reserve amount		1.6 L (0.35 Imp gal, 0.42 US gal)
Carburetor:		
Type / quantity		BST34/1
Manufacturer		MIKUNI
Spark plug:		
Type		DR7EA
Manufacturer		NGK
Spark plug gap		0.6 ~ 0.7 mm (0.024 ~ 0.028 in)
Clutch type		Wet, centrifugal automatic
Transmission:		
Primary reduction system		Spur gear
Primary reduction ratio		73/22 (3.318)
Secondary reduction system		Shaft drive
Secondary reduction ratio		19/18 × 46/11 (4.414)
Transmission type		Constant mesh 5-speed
Operation		Left foot operation
Gear ratio:	1st	34/12 (2.833)
	2nd	34/19 (1.789)
	3rd	29/22 (1.318)
	4th	26/25 (1.040)
	5th	23/28 (0.821)
Reverse gear ratio		73/22 × 34/12 × 19/18 × 46/11 (41.500)
Chassis:		
Frame type		Steel tube frame
Caster angle		4°
Kingpin angle		13°
Trail		20 mm (0.79 in)
Tread (STD)	front	785 mm (30.9 in)
Tread (STD)	rear	770 mm (30.3 in)
Toe-in		0 ~ 5 mm (0 ~ 0.20 in)
Tire:		
Type		Tubeless
Size	front	AT22 × 7-10
	rear	AT22 × 10-10
Manufacturer	front	CARLISLE/DUNLOP
	rear	CARLISLE/DUNLOP
Type	front	TRAIL WOLF/KT701
	rear	TRAIL WOLF/KT705

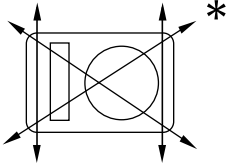
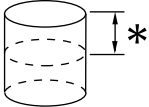
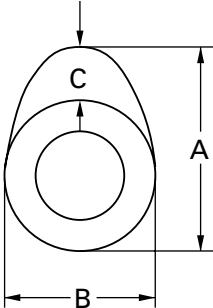


Item		Standard
Tire pressure (cold tire):		
Recommended	front	20 kPa (0.20 kg/cm <sup>2</sup> , 2.9 psi)
	rear	25 kPa (0.25 kg/cm <sup>2</sup> , 3.6psi)
Minimum	front	17 kPa (0.17 kg/cm <sup>2</sup> , 2.5 psi)
	rear	22 kPa (0.22 kg/cm <sup>2</sup> , 3.2 psi)
Maximum	front	23 kPa (0.23 kg/cm <sup>2</sup> , 3.3 psi)
	rear	28 kPa (0.28 kg/cm <sup>2</sup> , 4.0 psi)
Brake:		
Front brake	type	Drum brake
	operation	Right hand operation
Rear brake	type	Drum brake (full sealed)
	operation	Left hand and right foot operation
Suspension:		
Front suspension		Strut
Rear suspension		Swingarm (monocross)
Shock absorber:		
Front shock absorber		Coil spring / oil damper
Rear shock absorber		Coil spring / oil damper
Wheel travel:		
Front wheel travel		125 mm (4.92 in)
Rear wheel travel		135 mm (5.31 in)
Electrical:		
Ignition system		C.D.I.
Generator system		A.C. magneto
Battery type		YB14A-A2
Battery capacity		12 V 14 AH
Headlight type:		Bulb type
Bulb wattage × quantity:		
Headlight		12 V 25 W/ 25 W × 2
Tail light		12 V 7.5 W × 1
Indicator lights:		
Neutral		12 V 3.4 W × 1
Reverse		12 V 3.4 W × 1



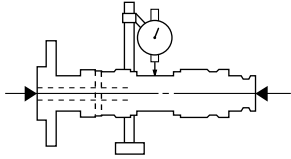

## MAINTENANCE SPECIFICATIONS

### ENGINE

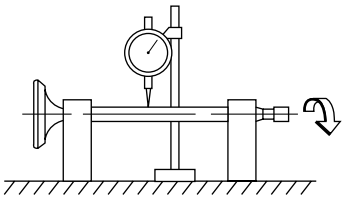
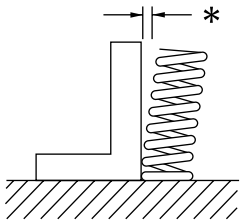
Item	Standard	Limit
Cylinder head: Warp limit  Measuring point *	----  Lines indicate straight edge measurement.	0.10 mm (0.004 in)
Cylinder: Bore size Measuring point * 	70.97 ~ 71.02 mm (2.794 ~ 2.796 in)  40 mm (1.6 in)	71.10 mm (2.799 in) ----
Camshaft: Drive method Cam cap inside diameter Camshaft outside diameter Shaft-to-cap clearance Cam dimensions 	Chain drive (Left) 25.000 ~ 25.033 mm (0.9843 ~ 0.9855 in) 24.96 ~ 24.98 mm (0.9827 ~ 0.9835 in) 0.020 ~ 0.073 mm (0.0008 ~ 0.0029 in)	---- ---- ---- ----
Intake "A" "B" "C"	36.537 ~ 36.637 mm (1.438 ~ 1.442 in) 30.131 ~ 30.231 mm (1.186 ~ 1.190 in) 6.527 ~ 6.647 mm (0.257 ~ 0.262 in)	36.437 mm (1.435 in) 30.031 mm (1.182 in) ----
Exhaust "A" "B"	36.582 ~ 36.682 mm (1.440 ~ 1.444 in) 30.252 ~ 30.352 mm (1.191 ~ 1.195 in)	36.482 mm (1.436 in) 30.152 mm (1.187 in)



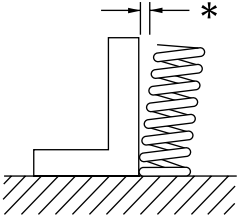
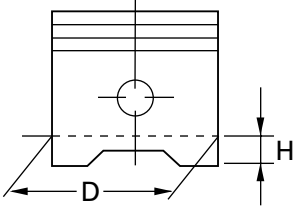
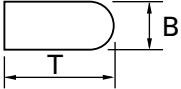


Item	Standard	Limit
<p>Camshaft runout limit</p> <p>"C"</p> 	<p>6.572 ~ 6.692 mm (0.259 ~ 0.263 in)</p> <p>----</p>	<p>----</p> <p>0.03 mm (0.0012 in)</p>
<p>Cam chain:</p> <p>Cam chain type / No. of links</p> <p>Cam chain adjustment method</p>	<p>DID25SH/104</p> <p>Automatic</p>	<p>----</p> <p>----</p>
<p>Rocker arm / rocker arm shaft:</p> <p>Rocker arm inside diameter</p> <p>Shaft outside diameter</p> <p>Arm-to-shaft clearance</p>	<p>12.000 ~ 12.018 mm (0.4724 ~ 0.4731 in)</p> <p>11.981 ~ 11.991 mm (0.4717 ~ 0.4721 in)</p> <p>0.009 ~ 0.037 mm (0.0004 ~ 0.0015 in)</p>	<p>----</p> <p>----</p> <p>----</p>
<p>Valve, valve seat, valve guide:</p> <p>Valve clearance (cold)</p> <p>IN</p> <p>EX</p> <p>Valve dimensions:</p>  <p>Head Dia</p> <p>Face Width</p> <p>Seat Width</p> <p>Margin Thickness</p>	<p>0.05 ~ 0.09 mm (0.002 ~ 0.004 in)</p> <p>0.11 ~ 0.15 mm (0.004 ~ 0.006 in)</p> <p>33.9 ~ 34.1 mm (1.335 ~ 1.343 in)</p> <p>28.4 ~ 28.6 mm (1.118 ~ 1.126 in)</p> <p>1.7 ~ 2.8 mm (0.067 ~ 0.110 in)</p> <p>1.7 ~ 2.8 mm (0.067 ~ 0.110 in)</p> <p>0.9 ~ 1.1 mm (0.035 ~ 0.043 in)</p> <p>0.9 ~ 1.1 mm (0.035 ~ 0.043 in)</p> <p>0.8 ~ 1.2 mm (0.032 ~ 0.047 in)</p> <p>0.8 ~ 1.2 mm (0.032 ~ 0.047 in)</p> <p>5.975 ~ 5.990 mm (0.2352 ~ 0.2358 in)</p> <p>5.960 ~ 5.975 mm (0.2346 ~ 0.2352 in)</p>	<p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p> <p>1.6 mm (0.063 in)</p> <p>1.6 mm (0.063 in)</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p>
<p>"A" head diameter</p> <p>"B" face width</p> <p>"C" seat width</p> <p>"D" margin thickness</p> <p>Stem outside diameter</p>	<p>IN</p> <p>EX</p> <p>IN</p> <p>EX</p> <p>IN</p> <p>EX</p>	<p>----</p> <p>----</p> <p>1.6 mm (0.063 in)</p> <p>1.6 mm (0.063 in)</p> <p>----</p> <p>----</p> <p>----</p> <p>----</p>

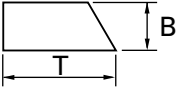
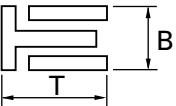
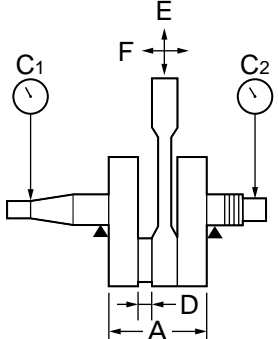


Item		Standard	Limit
Guide inside diameter	IN	6.000~ 6.012mm (0.236 ~ 0.237 in)	----
	EX	6.000~ 6.012mm (0.236 ~ 0.237 in)	----
Stem-to-guide clearance	IN	0.010 ~ 0.037 mm (0.0004 ~ 0.0015 in)	0.08 mm (0.0031 in)
	EX	0.025 ~ 0.052 mm (0.001 ~ 0.002 in)	0.10 mm (0.0039 in)
Stem runout limit		----	0.03 mm (0.0012 in)
			
Valve seat width	IN	0.9 ~ 1.1 mm (0.035 ~ 0.043 in)	----
	EX	0.9 ~ 1.1 mm (0.035 ~ 0.043 in)	----
Valve spring:			
Inner spring:			
Free length	IN	35.5 mm (1.4 in)	----
	EX	35.5 mm (1.4 in)	----
Set length (valve closed)	IN	30.5 mm (1.2 in)	----
	EX	30.5 mm (1.2 in)	----
Compressed pressure (installed)	IN	82.4 ~ 100.0 N (8.4 ~ 10.2 kg, 18.5 ~ 22.5 lb)	----
	EX	82.4 ~ 100.0 N (8.4 ~ 10.2 kg, 18.5 ~ 22.5 lb)	----
Tilt limit *	IN		2.5°/ 1.6 mm (2.5°/0.06 in)
	EX		2.5°/ 1.6 mm (2.5°/0.06 in)
			
Direction of winding (top view)	IN	Counterclockwise	----
	EX	Counterclockwise	----
Outer spring:			
Free length	IN	37.2 mm (1.46 in)	----
	EX	37.2 mm (1.46 in)	----
Set length (valve closed)	IN	32.0 mm (1.26 in)	----
	EX	32.0 mm (1.26 in)	----



Item		Standard	Limit
Compressed pressure (installed)	IN	162.8 ~ 200.1 N (16.6 ~ 20.4 kg, 36.6 ~ 45.0 lb)	----
	EX	162.8 ~ 200.1 N (16.6 ~ 20.4 kg, 36.6 ~ 45.0 lb)	----
Tilt limit *	IN		2.5°/1.6 mm (2.5°/0.06 in)
	EX		2.5°/1.6 mm (2.5°/0.06 in)
			
Direction of winding (top view)	IN	Clockwise	----
	EX	Clockwise	----
<b>Piston:</b> Piston to cylinder clearance Piston size "D" 		0.04 ~ 0.06 mm (0.0016 ~ 0.0024 in) 70.92 ~ 70.97 mm (2.792 ~ 2.794 in)	0.15 mm (0.0059 in) -----
Measuring point "H" Piston off-set Piston off-set direction Piston pin bore inside diameter Piston pin outside diameter		4.0 mm (0.16 in) from bottom line of piston skirt 0.5 mm (0.02 in) In side 16.002 ~ 16.013 mm (0.6300 ~ 0.6304 in) 15.991 ~ 16.000 mm (0.6296 ~ 0.6299 in)	----- ----- ----- ----- -----
<b>Piston rings:</b> Top ring: 			
Type Dimensions (B × T) End gap (installed)		Barrel 1.2 × 2.8 mm (0.047 × 0.110 in) 0.15 ~ 0.30 mm (0.006 ~ 0.012 in)	----- ----- 0.4 mm (0.016 in)



Item	Standard	Limit
Side clearance (installed)  2nd ring:    Type Dimensions (B × T) End gap (installed)  Side clearance  Oil ring:    Dimensions (B × T) End gap (installed)	0.03 ~ 0.07 mm (0.001 ~ 0.003 in)   Taper 1.2 × 2.8 mm (0.047 ~ 0.110 in) 0.15 ~ 0.30 mm (0.006 ~ 0.012 in) 0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in)   2.5 × 2.8 mm (0.098 × 0.110 in) 0.2 ~ 0.7 mm (0.008 ~ 0.028 in)	0.12 mm (0.005 in)  ---- ---- 0.4 mm (0.016 in) 0.12 mm (0.005 in)  ---- ----
Crankshaft:    Crank width "A"  Runout limit C1  C2  Big end side clearance "D"  Big end radial clearance "E"  Small end free play "F"	55.95 ~ 56.00 mm (2.203 ~ 2.205 in)  ----  ----  0.35 ~ 0.65 mm (0.014 ~ 0.026 in) 0.010 ~ 0.025 mm (0.0004 ~ 0.0010 in) 0.8 ~ 1.0 mm (0.032 ~ 0.040 in)	----  0.03 mm (0.0012 in) 0.06 mm (0.0024 in) ---- ---- 2.0 mm (0.08 in)
Balancer: Balancer drive method	Gear	----
Clutch: Friction plate:      Thickness Quantity	2.94 ~ 3.06 mm (0.116 ~ 0.120 in) 5 pcs.	2.8 mm (0.110 in) ----



Item		Standard	Limit
Clutch plate	Thickness	1.45 ~ 1.75mm (0.057 ~ 0.069 in)	0.2 mm (0.008 in)
	Quantity	4 pcs.	----
Clutch spring	Free length	35.1 mm (1.38 in)	32.9 mm (1.30 in)
	Quantity	4 pcs.	----
Clutch release method		Outer push, cam push	----
Automatic centrifugal clutch:			
Clutch shoe:	Thickness	2.0 mm (0.08 in)	1.5 mm (0.06 in)
	Quantity	3 pcs.	----
Clutch shoe spring free length		32.47 mm (1.278 in)	----
Clutch-in revolution		1,800 ~ 2,100 r/min	----
Clutch-stall revolution		3,200 ~ 3,600 r/min	----
Transmission:			
Main axle deflection		----	0.08 mm (0.0032 in)
Drive axle deflection		----	0.08 mm (0.0032 in)
Shifter:			
Shifter type		Cam drum and guide bar	----
Guide bar bending limit		----	0.8 mm (0.032 in)
Carburetor:			
I. D. mark		4XE1 00	----
Main jet	(M.J)	#95	----
Main air jet	(M.A.J)	0.7	----
Jet needle	(J.N)	5CE35	----
Needle jet	(N.J)	P-2 (#823)	----
Pilot air jet	(P.A.J.1)	#80	----
Pilot air jet	(P.A.J.2)	1.3	----
Pilot outlet	(P.O)	0.85	----
Pilot jet	(P.J)	#42.5	----
Bypass 1	(B.P.1)	0.8	----
Bypass 2	(B.P.2)	0.8	----
Bypass 3	(B.P.3)	0.8	----
Pilot screw	(P.S)	2.0 turns out	----
Valve seat size	(V.S)	2.0	----
Starter jet	(G.S.1)	#100	----
	(G.S.2)	0.7	----
Throttle valve size	(Th.V)	#130	----
Float height	(F.H)	12.0 ~ 14.0mm (0.47 ~ 0.55 in)	----
Fuel level	(F.L)	1.0 ~ 2.0 mm (0.04 ~ 0.08 in)	----
Engine idle speed		1,400 ~ 1,500 r/min	----
Intake vacuum		30.7 kPa (230 mmHg, 9.06 inHg)	----

# MAINTENANCE SPECIFICATIONS

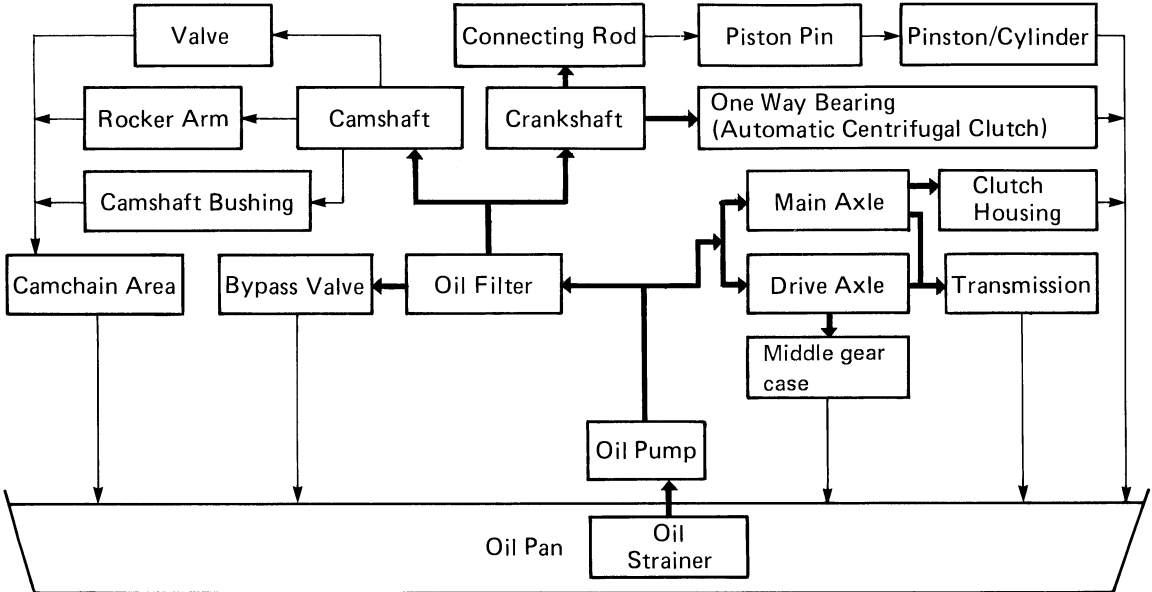
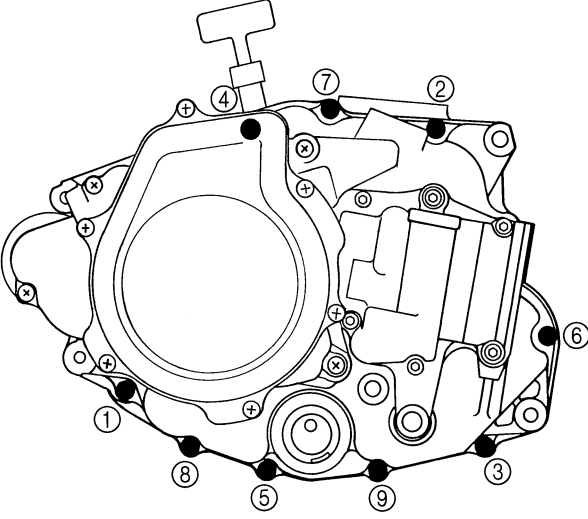
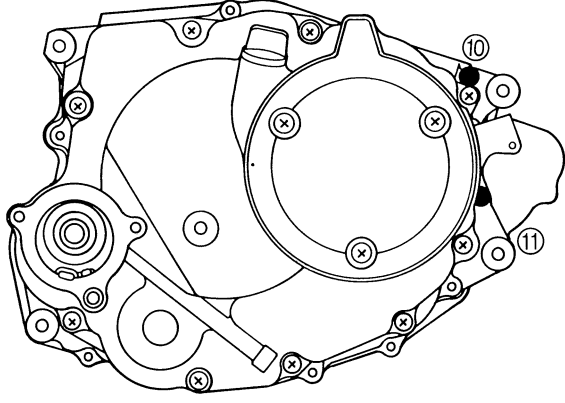
**SPEC**



Item	Standard	Limit
Lubrication system:		
Oil filter type	Wire mesh	----
Oil pump type	Trochoid type	----
Tip clearance "A" or "B"	0.15 mm (0.006 in)	0.20 mm (0.008 in)
Side clearance	0.04 ~ 0.09 mm (0.002 ~ 0.004 in)	0.09 mm (0.004 in)
Bypass valve setting pressure	80 ~ 120 kPa (0.8 ~ 1.2 kg/cm <sup>2</sup> , 11 ~ 17 psi)	----
Shaft drive:		
Middle gear backlash (forward)	0.1 ~ 0.2 mm (0.004 ~ 0.008 in)	----
Middle gear backlash (reverse)	0.10 ~ 0.25 mm (0.004 ~ 0.010 in)	----
Final gear backlash	0.1 ~ 0.2 mm (0.004 ~ 0.008 in)	----





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Item	Standard
Lubrication chart:	
<p>➡ : Pressured feed → : Splashed</p> 	
Crankcase tightening sequence:	
Crankcase (left)	Crankcase (right)
	



## Tightening torques

Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Cylinder head (oil gallery plug)	Bolt	M6	1	7	0.7	5.1	 Apply oil to the washer
Cylinder head	Flange bolt	M8	4	22	2.2	16	
Cylinder head and Cylinder	Bolt	M8	2	22	2.2	16	
Cam sprocket cover	Screw	M6	2	7	0.7	5.1	
Tappet cover	Bolt	M6	5	10	1.0	7.2	Use lock washer
Camshaft bushing retainer	Bolt	M6	2	8	0.8	5.8	
Spark plug	—	M12	1	17.5	1.75	12.5	Use lock washer
Cylinder	Bolt	M6	2	10	1.0	7.2	
Balancer drive gear	Nut	M14 × 1.0	1	50	5.0	36	
Starter pulley	Bolt	M10 × 1.25	1	50	5.0	36	
Valve clearance adjusting locknut	Nut	M6	2	14	1.4	10	
Cam sprocket	Bolt	M10	1	60	6.0	43	
Chain tensioner	Bolt	M6	2	10	1.0	7.2	
Chain tensioner cap	Bolt	M6	1	7	0.7	5.1	
Chain guide (intake)	Bolt	M6	2	8	0.8	5.8	Tighten cable guide together
Oil pump	Screw	M6	3	7	0.7	5.1	
Drain plug	Plug	M35	1	43	4.3	31	
Oil filter cover (drain)	Bolt	M6	1	10	1.0	7.2	
Oil filter cover	Bolt	M6	2	10	1.0	7.2	
Carburetor joint and cylinder head	Bolt	M6	2	12	1.2	8.7	
Carburetor and carburetor joint	Hose clamp	M4	1	2	0.2	1.4	
Carburetor and joint hose	Hose clamp	M5	1	2	0.2	1.4	
Air filter case and joint hose	Hose clamp	M5	1	2	0.2	1.4	
Air filter case and air duct	Hose clamp	M5	1	2	0.2	1.4	
Muffler	Bolt	M8	2	34	3.4	25	
Muffler and exhaust pipe	Bolt	M8	1	20	2.0	14	
Exhaust pipe	Bolt	M6	2	10	1.0	7.2	
Crankcase	Screw	M6	11	7	0.7	5.1	
Recoil starter	Screw	M6	6	7	0.7	5.1	
Crankcase spacer (right)	Screw	M6	8	7	0.7	5.1	
Crankcase cover							 
Bearing retainer (right)	Screw	M6	3	7	0.7	5.1	
(left)	Screw	M5	3	7	0.7	5.1	
Clutch cover protector	Screw	M6	3	7	0.7	5.1	
Crankcase cover (right)	Screw	M6	9	7	0.7	5.1	Use lock washer
Crankcase cover (left)	Bolt	M6	8	7	0.7	5.1	
Clutch carrier assembly	Screw	M22	1	78	7.8	56	
Clutch spring	Bolt	M5	4	6	0.6	4.3	
Clutch boss	Nut	M14	1	50	5.0	36	Use lock washer
Shift cam segment	Screw	M6	1	12	1.2	8.7	











# MAINTENANCE SPECIFICATIONS

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Part to be tightened	Part name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Lock nut (clutch release adjuster)	Nut	M8	1	15	1.5	11	
Starter clutch	Bolt	M8	3	30	3.0	22	 Stake
Starter motor	Screw	M6	2	7	0.7	5.1	
Pinion gear (drive axle)	Nut	M16	1	60	6.0	43	Stake
Bearing retainer (drive axle)	Screw	M8	3	25	2.5	18	
Bearing retainer (bearing housing)	Nut	–	1	60	6.0	43	
	Nut	–	1	60	6.0	43	
	Nut	–	1	60	6.0	43	
	Nut	–	1	60	6.0	43	
Bearing housing	Bolt	M8	4	23	2.3	17	
Middle driven axle and U-joint	Nut	M12	1	60	6.0	43	
Drive select lever component:							
Drive select lever assembly	Bolt	M6	2	12	1.2	8.7	
	Straight screw plug	M14	1	15	1.5	11	
Locknut	Nut	M8	1	15	1.5	11	
(select lever adjuster)	Nut	M8	1	15	1.5	11	
Lever complete	Flange nut	M6	1	10	1.0	7.2	
Final drive gear component:							
Final drive gear case and swingarm	Flange nut	M8	4	48	4.8	35	
Oil filler bolt	Bolt	M14	1	23	2.3	17	
Drain plug	Bolt	M14	1	23	2.3	17	
Bearing housing (ring gear)	Bolt	M10	2	40	4.0	29	
	Bolt	M8	6	23	2.3	17	
Bearing retainer (drive)	–	–	1	100	10.0	72	
Shift pedal	Bolt	M6	1	10	1.0	7.2	
Magneto base	Screw	M6	3	7	0.7	5.1	
Neutral switch	–	M12	1	20	2.0	14	
Reverse switch	–	M12	1	20	2.0	14	



## CHASSIS

Item	Standard	Limit
Steering system:		
Steering bearing type	Ball bearing	----
Front suspension:		
Shock absorber travel	117 mm (4.61 in)	----
Suspension spring free length	293 mm (11.54 in)	----
Spring rate (K1)	10 N/mm (1.0 kg/mm, 56 lb/in)/ 0 ~ 117 mm (0 ~ 4.61 in)	----
Optional spring	No	----
Rear suspension:		
Shock absorber travel	85 mm (3.35 in)	----
Suspension spring free length	263 mm (10.35 in)	----
Fitting length	244 mm (9.61 in)	----
Spring rate	49 N/mm (4.9 kg/mm, 279.79 lb/in)/ 0 ~ 85 mm (0 ~ 3.35 in)	----
Optional spring	No	----
Swingarm:		
Free play limit end	----	1.0 mm (0.04 in)
side	----	1.0 mm (0.04 in)
Front wheel:		
Type	Disc wheel	----
Rim size	10 × 5.5AT	----
Rim material	Steel	----
Rim runout limit radial	----	2.0 mm (0.08 in)
lateral	----	2.0 mm (0.08 in)
Rear wheel:		
Type	Disc wheel	----
Rim size	10 × 8.0AT	----
Rim material	Steel	----
Rim runout limit radial	----	2.0 mm (0.08 in)
lateral	----	2.0 mm (0.08 in)



Item	Standard	Limit
Front drum brake:		
Type	Leading and trailing	----
Drum inside diameter	160 mm (6.30 in)	161 mm (6.34 in)
Lining thickness	4.0 mm (0.16 in)	2.0 mm (0.08 in)
Shoe spring free length	71.0 mm (2.80 in)	----
Rear drum brake:		
Type	Leading and trailing	----
Drum inside diameter	160 mm (6.30 in)	161 mm (6.34 in)
Lining thickness	4.0 mm (0.16 in)	2.0 mm (0.04 in)
Shoe spring free length	71.0 mm (2.80 in)	----
Brake lever and brake pedal:		
Brake lever free play (at lever pivot)	5 ~ 7 mm (0.20 ~ 0.28 in)	----
Brake lever free play (left)	5 ~ 7 mm (0.20 ~ 0.28 in)	----
Brake pedal free play	20 ~ 30 mm (0.78 ~ 1.18 in)	----
Throttle lever free play	3 ~ 5 mm (0.12 ~ 0.20 in)	----



## Tightening torques

Part to be tightened	Parts name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Front panel wheel and brake drum	Nut	M10 × 1.25	8	55	5.5	40	Use lock washer
Front brake drum and steering knuckle	Nut	M14 × 1.5	2	70	7.0	50	
Front brake cam lever and cam shaft	Bolt	M6 × 1.0	2	9	0.9	6.5	
Steering knuckle and front shock absorber	Nut	M12 × 1.25	4	78	7.8	56	
Front shock absorber and frame	Nut	M35 × 1.5	2	55	5.5	40	
Steering knuckle and Tie-rod end	Nut	M12 × 1.25	2	25	2.5	18	
Tie-rod and locknut	Nut	M10 × 1.25	4	30	3.0	22	
Steering shaft and tie-rod end	Nut	M12 × 1.25	2	25	2.5	18	
Steering shaft (lower) and frame	Nut	M10 × 1.25	1	30	3.0	22	
Steering shaft holder and frame	Bolt	M8 × 1.25	2	23	2.3	17	
Steering shaft and upper handle-bar holder	Bolt	M8 × 1.25	4	20	2.0	14	
Front lower arm and frame	Nut	M10 × 1.25	4	45	4.5	32	
Front lower arm and steering knuckle	Nut	M10 × 1.25	2	25	2.5	18	
Engine stay and frame (upper)	Bolt	M8 × 1.25	2	33	3.3	24	
Engine mounting (upper)	Nut	M8 × 1.25	1	33	3.3	24	
Engine mounting (front)	Nut	M8 × 1.25	1	48	4.8	35	
Engine mounting (rear-upper)	Nut	M8 × 1.25	1	33	3.3	24	
Engine mounting (rear-lower)	Nut	M8 × 1.25	1	33	3.3	24	
Front fender and frame	Bolt	M6 × 1.25	2	7	0.7	5.1	
Front fender and fender stay	Nut	M6 × 1.0	2	7	0.7	5.1	
Front bumper and frame	Bolt	M8 × 1.25	4	16	1.6	12	
Front carrier and front bumper	Nut	M6 × 1.0	2	11	1.1	8.0	
Front carrier and frame	Bolt	M8 × 1.25	2	34	3.4	25	
Rear fender and frame	Bolt	M6 × 1.0	2	7	0.7	5.1	
Rear fender and plate (footrest)	Bolt	M6 × 1.0	2	7	0.7	5.1	
Rear carrier and frame	Bolt	M6 × 1.0	2	9	0.9	6.5	
	Bolt	M8 × 1.25	2	34	3.4	25	
Rear fender and rear bumper	Nut	M6 × 1.0	2	7	0.7	5.1	
Footrest and frame	Bolt	M10 × 1.25	4	65	6.5	47	
Footrest plate and frame	Bolt	M8 × 1.25	2	30	3.0	22	
Footrest plate and footrest	Nut	M8 × 1.25	4	30	3.0	22	
Rear panel wheel and wheel hub	Nut	M10 × 1.25	8	55	5.5	40	
Rear axle and nut	Nut	M16 × 1.5	2	150	15	110	
Rear brake cam lever and cam shaft	Bolt	M6 × 1.0	1	9	0.9	6.5	
Rear brake shoe plate and rear axle housing	Bolt	M8 × 1.25	4	28	2.8	20	
Pivot shaft (left)	–	M22 × 1.5	1	130	13	94	
Pivot shaft (right)	–	M22 × 1.5	1	6	0.6	4.3	

# MAINTENANCE SPECIFICATIONS

**SPEC**



Part to be tightened	Parts name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Pivot shaft and nut (right)	Nut	M22 × 1.5	1	130	13	94	
Swingarm and final drive gear case	Nut	M8 × 1.25	4	48	4.8	35	
Rear axle housing and final drive gear case	Bolt	M10 × 1.25	4	55	5.5	40	
Rear shock absorber (upper) and frame	Nut	M12 × 1.25	1	50	5.0	36	
Final drive gear case protector	Bolt	M8 × 1.25	2	17	1.7	12	
Rear axle housing and swingarm	Nut	M12 × 1.25	4	103	10.3	74	
Fuel tank and frame	Bolt	M6 × 1.0	2	10	1.0	7.2	
Fuel tank and fuel cock	Screw	M6 × 1.0	2	5	0.5	3.6	

**2**



## ELECTRICAL

Item	Standard	Limit
Voltage:	12 V	----
Ignition system:		
Ignition timing (B.T.D.C.)	10° / 1,000 r/min	----
Advanced timing (B.T.D.C.)	30° / 6,000 r/min	----
Advancer type	Electrical	----
<p>Ignition Timing (B.T.D.C.)</p> <p>Engine Speed (<math>\times 10^3</math> r/min)</p>		
C.D.I.:		
Magneto model / manufacturer	F4T203/MITSUBISHI	----
Pickup coil resistance / color	189 ~ 231 $\Omega$ at 20°C (68°F) / White/Green – White/Red	----
Source coil resistance / color	270 ~ 330 $\Omega$ at 20°C (68°F) / Brown – Black	----
C.D.I. unit model / manufacturer	F8T09273/MITSUBISHI	----
Ignition coil:		
Model / manufacturer	2JN/YAMAHA	----
Minimum spark gap	6 mm (0.24 in)	----
Primary winding resistance	0.18 ~ 0.28 $\Omega$ at 20°C (68°F)	----
Secondary winding resistance	6.3 ~ 9.5 k $\Omega$ at 20°C (68°F)	----
Spark plug cap:		
Type	Resin type	----
Resistance	10 k $\Omega$	----
Charging system:		
Type	A.C. magneto	----
Nominal output	14 to 15 V at 2,000 r/min	----
Stator coil resistance / color	0.45 ~ 0.55 $\Omega$ at 20°C (68°F) / White – Black	----
Rectifier/regulator:		
Model / manufacturer	SH640/SHINDENGEN	----
No load regulated voltage	14.1 ~ 14.9 V	----



Item	Standard	Limit
Withstand voltage	200 V	----
Battery:		
Specific Gravity	1.280	
Electric starter system:		
Type	Constant mesh type	----
Starter motor:		
Model / manufacturer	SM-14/MITSUBA	----
Output	0.5 kW	----
Armature coil resistance	0.004 ~ 0.005 $\Omega$ at 20°C (68°F)	----
Brush overall length	10 mm (0.4 in)	3.5 mm (0.14 in)
Spring force	730 ~ 970 g (7.16 ~ 9.52 N)	----
Commutator diameter	28 mm (1.10 in)	27 mm (1.06 in)
Mica undercut	0.7 mm (0.028 in)	----
Starter relay:		
Model / manufacturer	MS5F-561/JIDECO	----
Amperage rating	100 A	----
Coil winding resistance/color	4.2 ~ 4.6 $\Omega$ at 20°C (68°F)/ Red/White - Blue/White	----
Starting circuit cut-off relay:		
Model / manufacturer	ACA12115-3	----
Coil winding resistance	72 ~ 88 $\Omega$ at 20°C (68°F)	----
Diode	Yes	----
Circuit breaker:		
Type	Fuse	----
Amperage for individual circuit:		
Main fuse	30 A $\times$ 1	----
Reserve	30 A $\times$ 1	----



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## HOW TO USE THE CONVERSION TABLE

All specification data in this manual are listed in SI and METRIC UNITS.

Use this table to convert METRIC unit data to IMPERIAL unit data.

Ex.

METRIC	MULTIPLIER	IMPERIAL
** mm ×	0.03937	= ** in
2 mm ×	0.03937	= 0.08 in

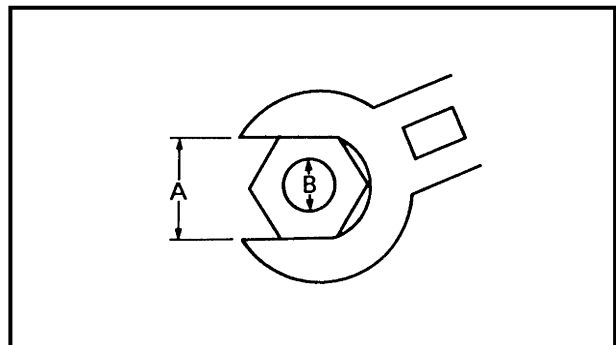
## CONVERSION TABLE

METRIC TO IMPERIAL			
	Metric unit	Multiplier	Imperial unit
Torque	m·kg	7.233	ft·lb
	m·kg	86.794	in·lb
	cm·kg	0.0723	ft·lb
	cm·kg	0.8679	in·lb
Weight	kg	2.205	lb
	g	0.03527	oz
Speed	km/hr	0.6214	mph
Distance	km	0.6214	mi
	m	3.281	ft
	m	1.094	yd
	cm	0.3937	in
	mm	0.03937	in
Volume/ Capacity	cc (cm <sup>3</sup> )	0.03527	oz (IMP liq.)
	cc (cm <sup>3</sup> )	0.06102	cu-in
	lt (liter)	0.8799	qt (IMP liq.)
	lt (liter)	0.2199	gal (IMP liq.)
Misc.	kg/mm	55.997	lb/in
	kg/cm <sup>2</sup>	14.2234	psi (lb/in <sup>2</sup> )
	Centigrade (°C)	9/5+32	Fahrenheit (°F)

EB202001

## GENERAL TORQUE SPECIFICATIONS

This chart specifies torque for standard fasteners with standard I.S.O. pitch threads. Torque specifications for special components or assemblies are provided for each chapter of this manual. To avoid warpage, tighten multi-fastener assemblies in a criss-cross fashion, in progressive stages, until the specified torque is reached. Unless otherwise specified, torque specifications require clean, dry threads. Components should be at room temperature.



A: Distance between flats

B: Outside thread diameter

A (nut)	B (bolt)	General torque specifications		
		Nm	m·kg	ft·lb
10 mm	6 mm	6	0.6	4.3
12 mm	8 mm	15	1.5	11
14 mm	10 mm	30	3.0	22
17 mm	12 mm	55	5.5	40
19 mm	14 mm	85	8.5	61
22 mm	16 mm	130	13.0	94





## LUBRICATION POINTS AND LUBRICANT TYPES

## ENGINE

Lubrication points (parts name)	Lubricant type
Oil seal lips (all)	
O-rings (all)	
Bearings (all)	
Washer (cylinder head bolt)	
Crank pin	
Connecting rod (big end)	
Piston and piston pin	
Piston and piston ring	
Buffer boss	
Valve stem and valve guide	
Oil seal (valve stem end)	
Rocker arm shaft and rocker arm	
Cam and bearing (camshaft)	
O-ring (drain plug)	
Push rod	
Primary driven gear and main axle	
Sliding gear (transmission)	
Free movement gear (transmission)	
Shift fork and guide bar	
Shift cam and bearing (shift cam)	
Shift shaft	
Shift ball holder and guide	
Shift shaft and shift pedal	
Crankcase mating surfaces	Sealant (Quick Gasket®) Yamaha Bond No. 1215
Adaptor (crankcase cover 1) and grommet	Sealant (Quick Gasket®) Yamaha Bond No. 1215

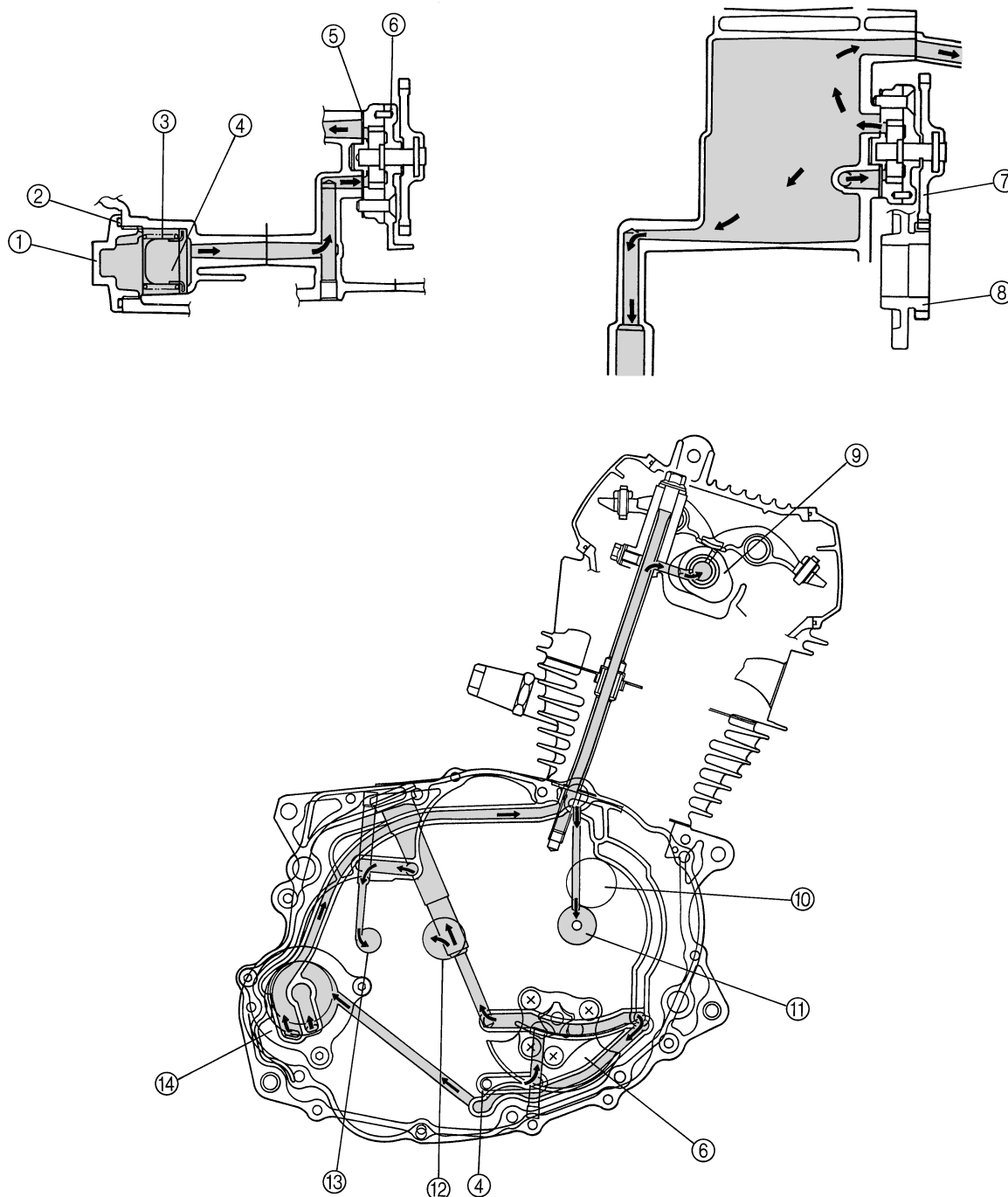


### CHASSIS

Lubrication points	Lubricant type
Oil seal lips (all)/O-rings (all)	
Steering shaft (Upper and lower with nipple bushes)	
Steering knuckle pivot	
Front lower arm (ball joint)	
Front wheel bearings	
Front drum brake: Brake cam shaft Pivot pin Oil seal lips	
Rear drum brake: Brake cam shaft Pivot pin	
Dust seal (rear backing plate)	Yamaha brake grease
Rear backing plate and brake cam bracket	Sealant (Quick Gasket®) Yamaha Bond No. 1215
Front brake cable joint	
Front and rear brake lever pivot	
Front brake cable adjuster and pin	
Rear brake cable adjuster and pin	
Rear brake pedal pivot	
Throttle lever holder cable end	
Drive select lever pivots	
Swingarm (pivot shaft, bearing)	
Final drive gear case and swingarm	Sealant (Quick Gasket®) Yamaha Bond No. 1215
Rear backing plate and swingarm	Sealant (Quick Gasket®) Yamaha Bond No. 1215
Rear shock absorber bushes	

**LUBRICATION DIAGRAMS**

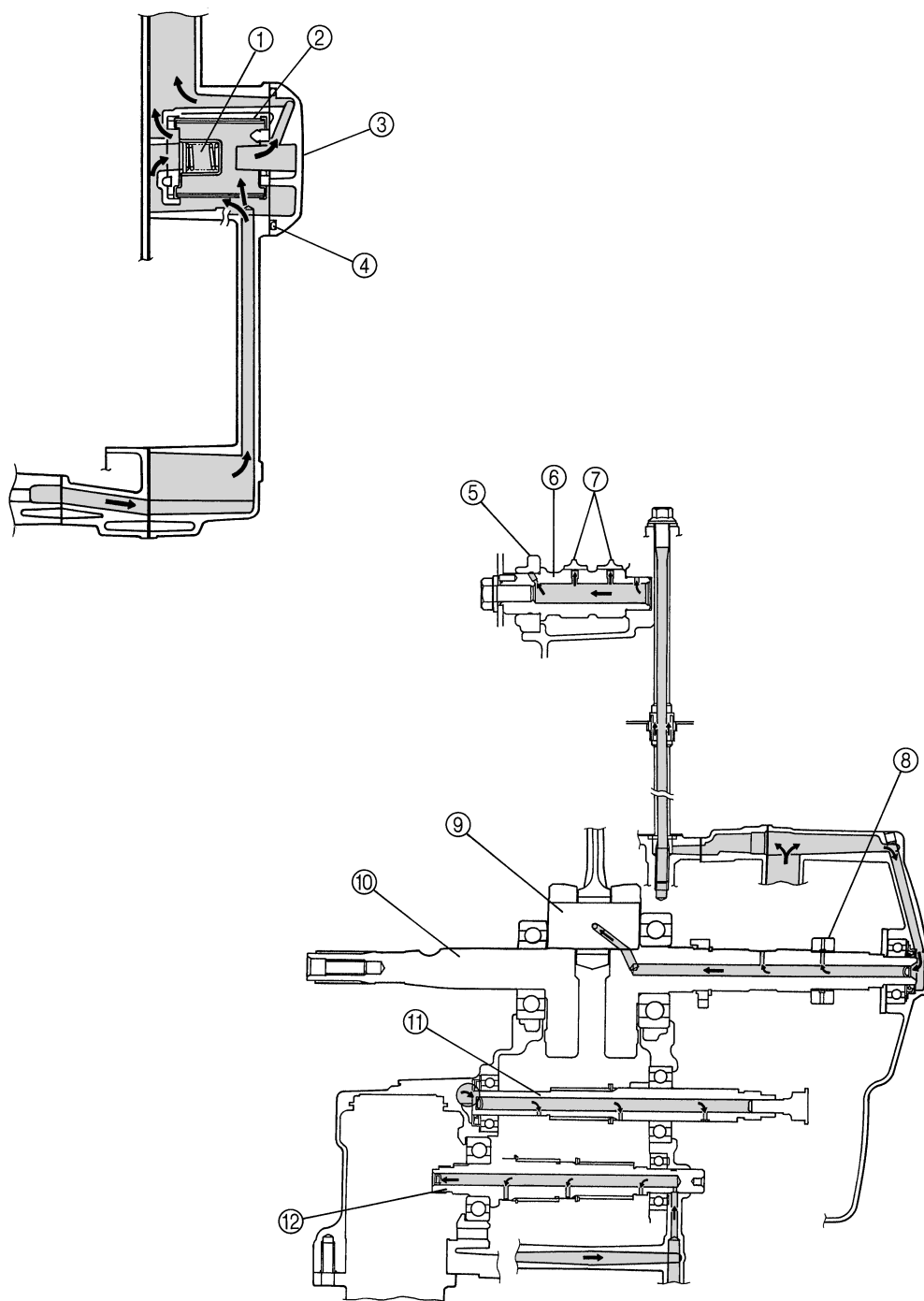
- ① Drain plug
- ② O-ring
- ③ Compression spring
- ④ Oil strainer
- ⑤ Oil pump gasket
- ⑥ Oil pump assembly
- ⑦ Oil pump driven gear
- ⑧ Oil pump drive gear
- ⑨ Camshaft
- ⑩ Crank pin
- ⑪ Crankshaft
- ⑫ Main axle
- ⑬ Drive axle
- ⑭ Oil filter





- ① Bypass valve
- ② Oil filter
- ③ Oil filter cover
- ④ O-ring
- ⑤ Collar
- ⑥ Camshaft
- ⑦ Rocker arm
- ⑧ One way bearing  
(Automatic centrifugal clutch)
- ⑨ Crank pin
- ⑩ Crankshaft
- ⑪ Main axle
- ⑫ Drive axle

2





## CABLE ROUTING

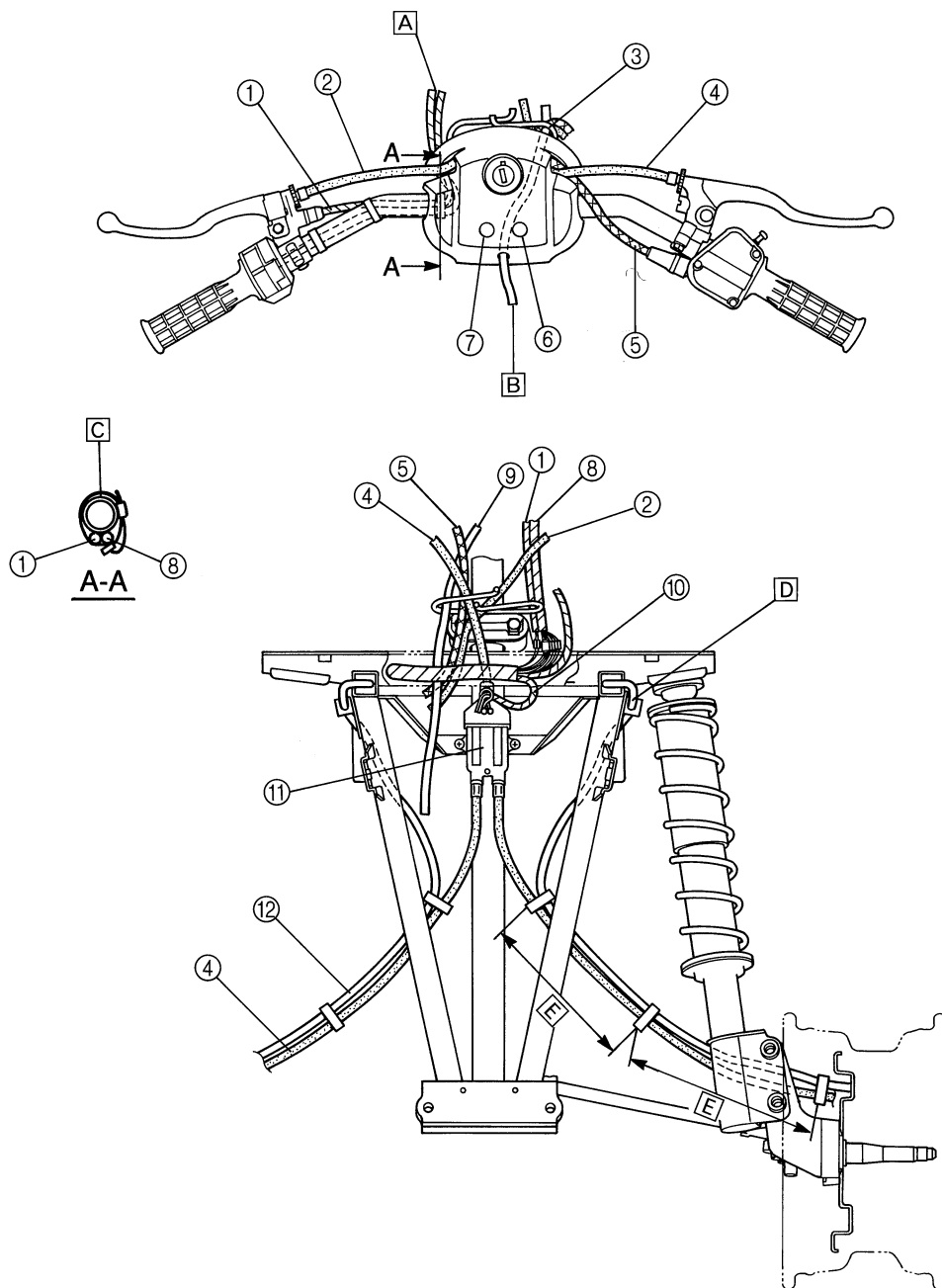
- ① Rear brake lever switch lead
- ② Rear brake cable
- ③ Cable guide
- ④ Front brake cable
- ⑤ Throttle cable
- ⑥ Neutral indicator light
- ⑦ Reverse indicator light
- ⑧ Handlebar switch assembly lead
- ⑨ Fuel tank breather hose
- ⑩ Headlight leads
- ⑪ Equalizer
- ⑫ Front brake breather hose

- [A] Do not route the handlebar switch assembly lead through the lower bracket cable guide.
- [B] Route the fuel tank breather hose through the hole in the handlebar cover and then to the right of the handlebar (below the handlebar, not over it). Then, pass the hose through the cable guide.
- [C] Fasten the handlebar switch assembly lead and rear brake lever switch lead underneath

the handlebar. Position the plastic band with its tab facing down.

- [D] Route the front brake breather hose through the plastic clamp on the frame and then insert the excess hose into the end of the frame.

[E] 140 mm (5.51 in)





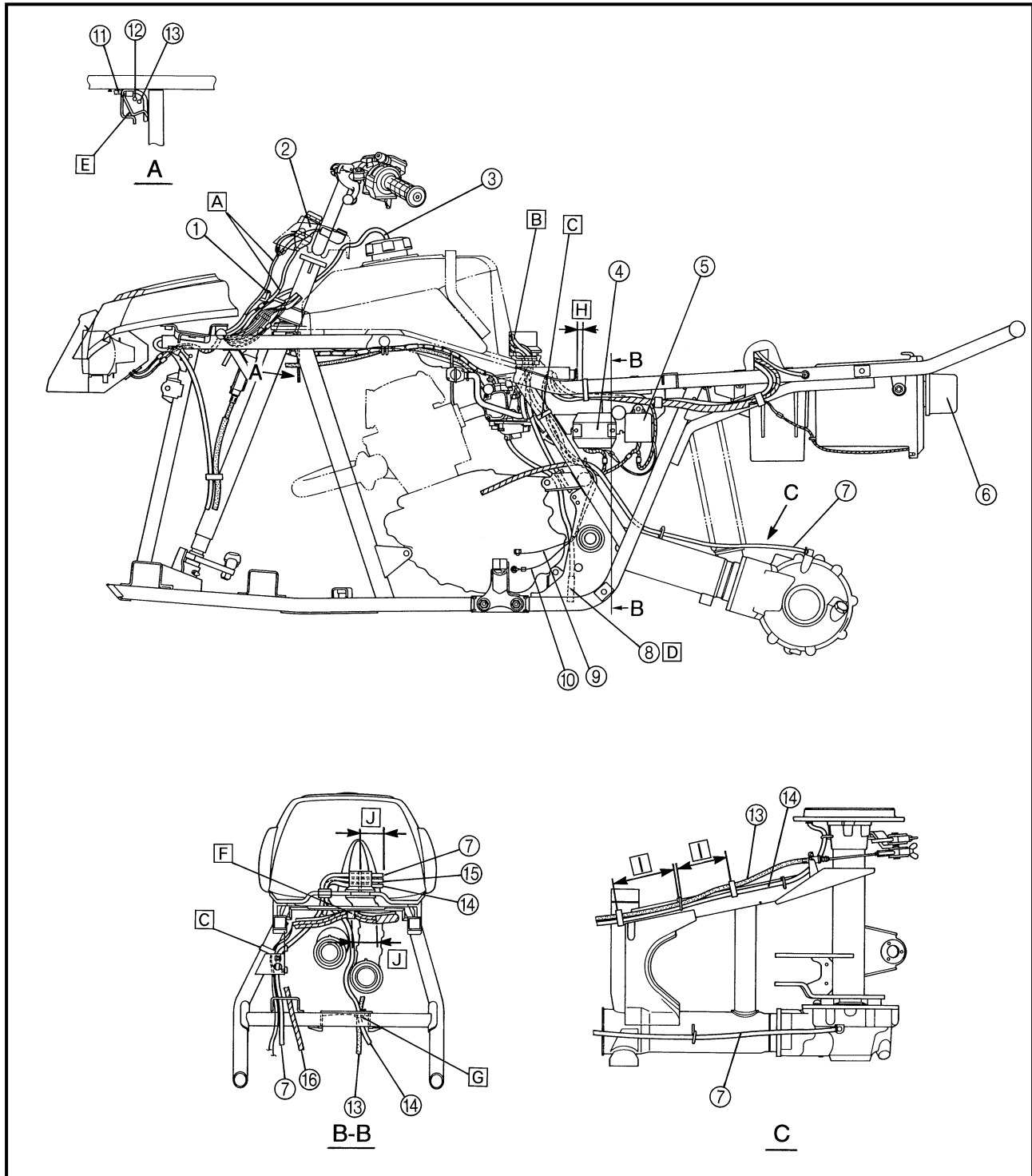
- ① Cable guide
- ② Main switch
- ③ Fuel tank breather hose
- ④ Rectifier/regulator
- ⑤ CDI unit
- ⑥ Taillight
- ⑦ Final gear case breather hose
- ⑧ Carburetor overflow hose
- ⑨ Reverse switch lead
- ⑩ Neutral switch lead
- ⑪ Starter motor lead

- ⑫ Throttle cable
- ⑬ Rear brake cable
- ⑭ Rear brake breather hose
- ⑮ Carburetor air vent hose
- ⑯ CDI magneto lead

**A** Route the main switch lead and indicator light lead to the side of the cable guide.

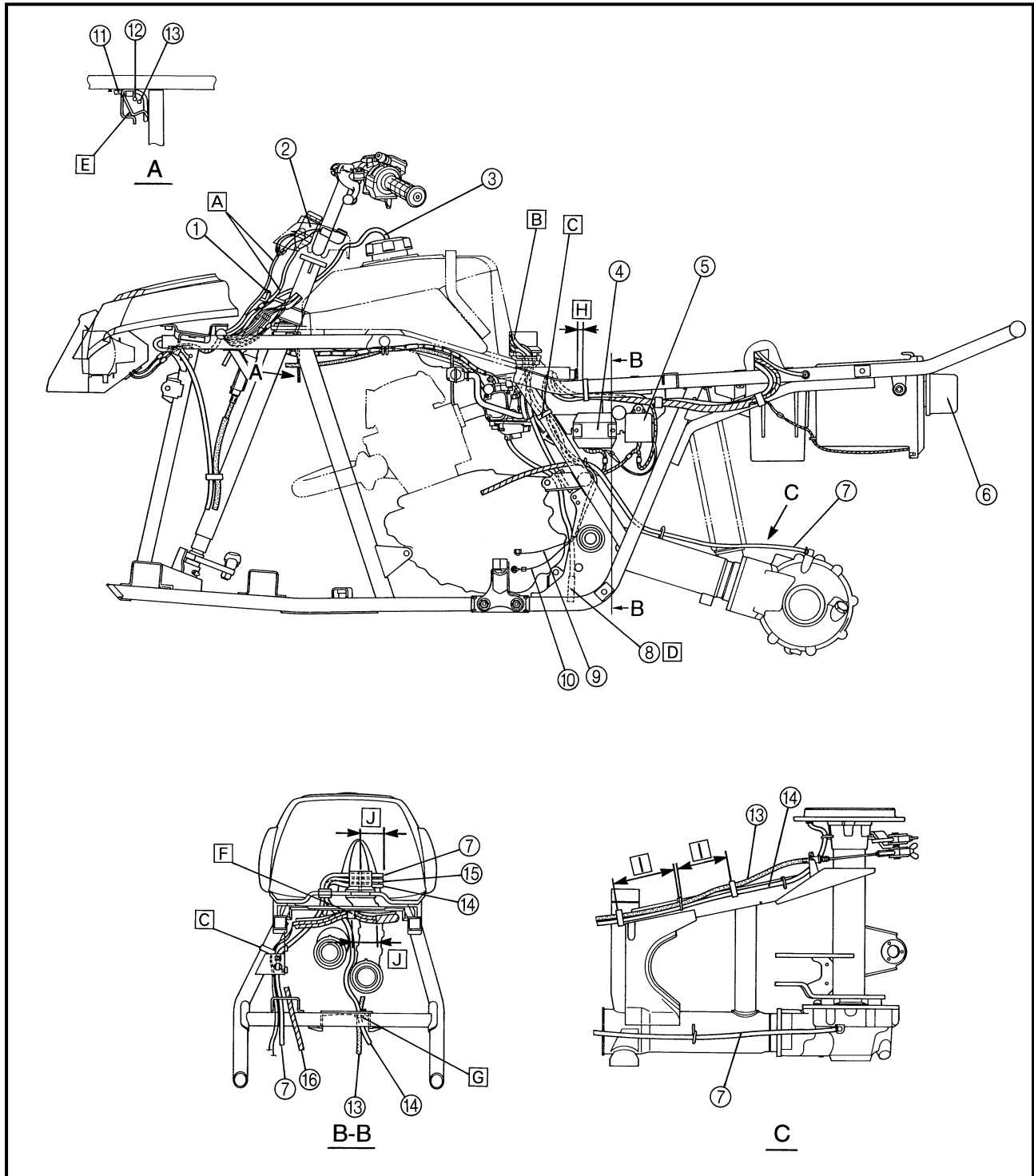
**B** Insert the hoses into the air duct after routing them through the fuel tank grommet.

**C** Fasten the neutral switch lead and reverse switch lead only.





- [D] Route the carburetor overflow hose between the engine and upper rear engine mount and then between the engine and swingarm. Make sure that the hose is not pinched.
- [E] Bend the cable guide after routing the cables.
- [F] Fasten the starter motor lead and wire harness to the frame with the plastic clamp.
- [G] Route the rear brake cable and rear brake breather hose through the cable guide.
- [H] 10 mm (0.4 in)
- [I] 100 mm (4.0 in)
- [J] 40 ~ 50 mm (1.6 ~ 2.0 in)

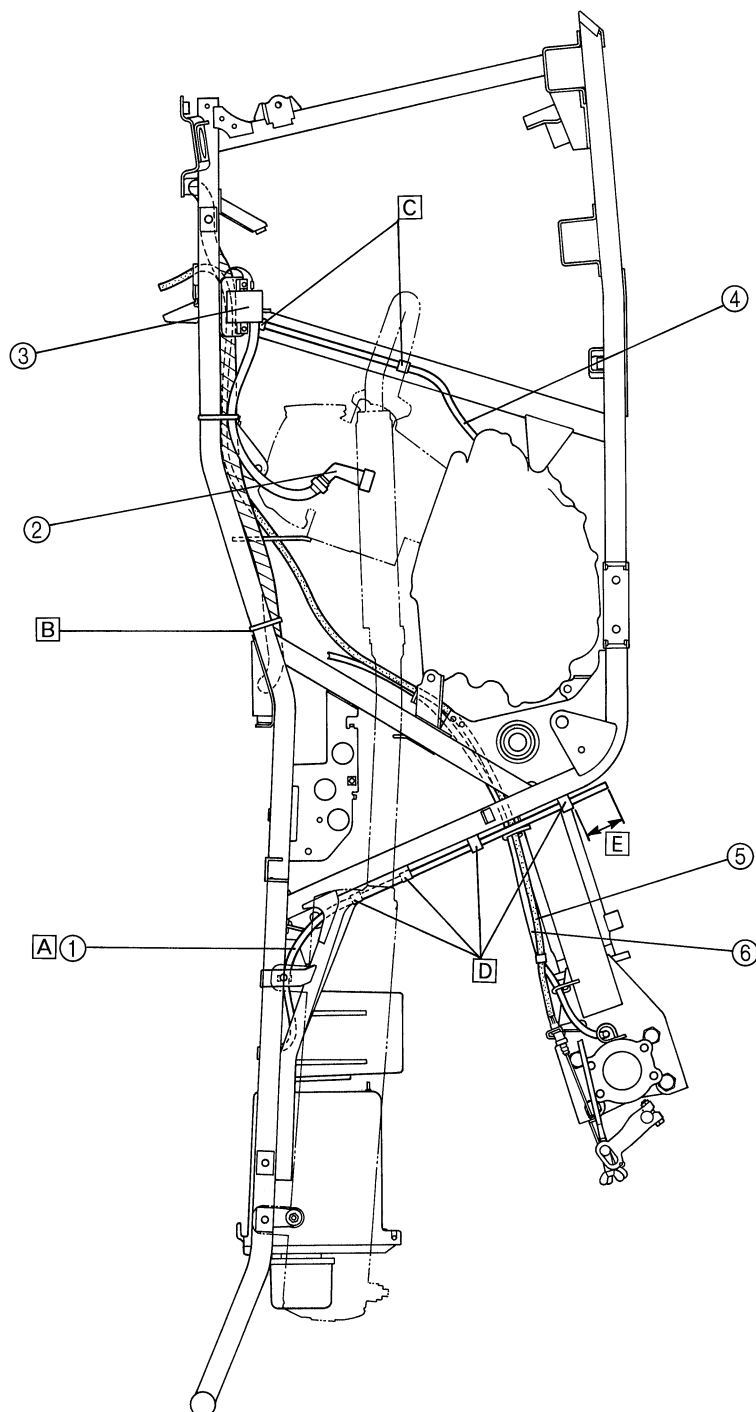




- ① Battery breather hose
- ② Spark plug cap
- ③ Ignition coil
- ④ Starter motor lead
- ⑤ Rear brake cable
- ⑥ Rear brake breather hose

- A Make sure that the battery breather hose is not kinked or bent.
- B Route the rear brake cable through the cable guide on the cylinder.
- C Fasten the starter motor lead to the frame with the metal clamp.
- D Fasten the battery breather hose with plastic clamps to the frame.
- E 50 ~ 60 mm (2.0 ~ 2.4 in)

2

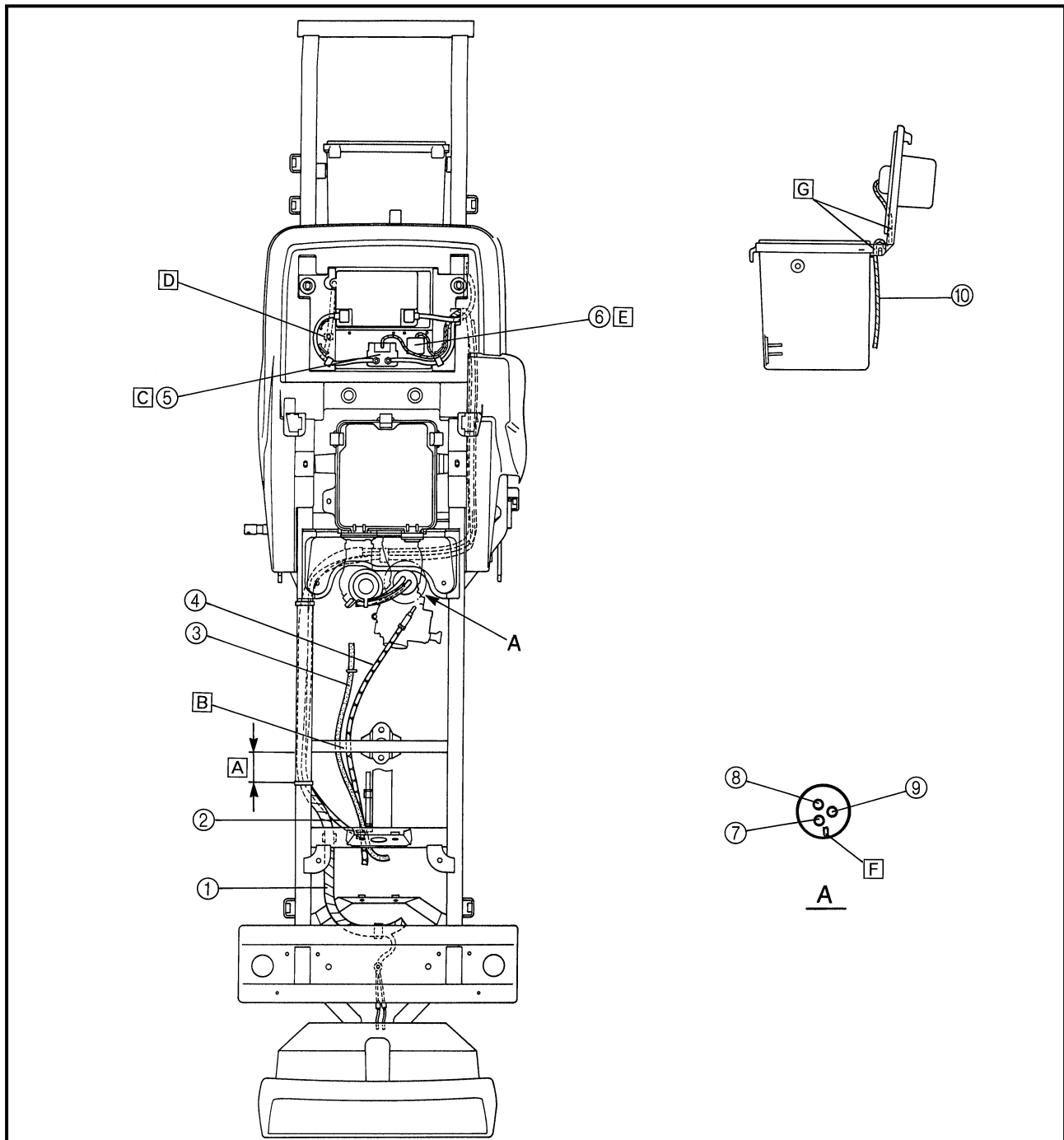






- ① Wire harness
- ② Starter motor lead
- ③ Rear brake cable
- ④ Throttle cable
- ⑤ Starter relay
- ⑥ Starting circuit cut-off relay
- ⑦ Rear brake breather hose
- ⑧ Carburetor air vent hose
- ⑨ Final gear case breather hose
- ⑩ Taillight lead

- A 50 mm (2.0 in)
- B Route the throttle cable and rear brake cable through the cable guide. Make sure that the throttle cable is routed to the inside of the rear brake cable.
- C Install the starter relay onto the tabs with its terminal side facing down.
- D Fasten the battery breather hose with the plastic clamp and then insert the clamp into the hole in the rear fender.
- E Install the starter circuit cut-off relay onto the tab with its terminal side facing down.
- F Make sure that the grommet is installed with the mark facing forward.
- G Route the taillight lead through the lead holders on the lid and the bottom of the box.





## PERIODIC INSPECTIONS AND ADJUSTMENTS

### INTRODUCTION

This chapter includes all information necessary to perform recommended inspections and adjustments. These preventive maintenance procedures, if followed, will ensure more reliable machine operation and a longer service life. In addition, the need for costly overhaul work will be greatly reduced. This information applies to machines already in service as well as new machines that are being prepared for sale. All service technicians should be familiar with this entire chapter.

### PERIODIC MAINTENANCE/LUBRICATION

ITEM	ROUTINE	INITIAL			EVERY	
		1 month	3 months	6 months	6 months	1 year
Valves*	<ul style="list-style-type: none"> <li>• Check valve clearance.</li> <li>• Adjust if necessary.</li> </ul>	○		○	○	○
Spark plug	<ul style="list-style-type: none"> <li>• Check condition.</li> <li>• Clean or replace if necessary.</li> </ul>	○	○	○	○	○
Air filter	<ul style="list-style-type: none"> <li>• Clean.</li> <li>• Replace if necessary.</li> </ul>	Every 20~40 hours (More often in wet or dusty area.)				
Carburetor*	<ul style="list-style-type: none"> <li>• Check idle speed/starter operation.</li> <li>• Adjust if necessary.</li> </ul>		○	○	○	○
Cylinder head breather system*	<ul style="list-style-type: none"> <li>• Check breather hose for cracks or damage.</li> <li>• Replace if necessary.</li> </ul>			○	○	○
Exhaust system*	<ul style="list-style-type: none"> <li>• Check for leakage.</li> <li>• Retighten for necessary.</li> <li>• Replace gasket if necessary.</li> </ul>			○	○	○
Fuel line*	<ul style="list-style-type: none"> <li>• Check fuel hose for cracks or damage.</li> <li>• Replace if necessary.</li> </ul>			○	○	○
Engine oil	<ul style="list-style-type: none"> <li>• Replace (Warm engine before draining).</li> </ul>	○		○	○	○
Engine oil filter	<ul style="list-style-type: none"> <li>• Clean.</li> </ul>	○		○		○
Engine oil strainer	<ul style="list-style-type: none"> <li>• Clean.</li> </ul>	○		○		○
Final gear oil	<ul style="list-style-type: none"> <li>• Check oil level/oil leakage.</li> <li>• Replace every 12 months.</li> </ul>	○				○
Brakes*	<ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Adjust if necessary.</li> </ul>	○	○	○	○	○
Clutch*	<ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Adjust if necessary.</li> </ul>	○		○	○	○
Wheels*	<ul style="list-style-type: none"> <li>• Check balance/damage/runout.</li> <li>• Replace if necessary.</li> </ul>	○		○	○	○
Wheel bearings*	<ul style="list-style-type: none"> <li>• Check bearing assembly for looseness/damage.</li> <li>• Replace if damaged.</li> </ul>	○		○	○	○
Front and rear suspension*	<ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Correct if necessary.</li> </ul>			○		○
Steering system*	<ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Replace if damaged.</li> <li>• Check toe-in.</li> <li>• Adjust if necessary.</li> </ul>	○	○	○	○	○

## PERIODIC MAINTENANCE/LUBRICATION



ITEM	ROUTINE	INITIAL			EVERY	
		1 month	3 months	6 months	6 months	1 year
Steering shaft*	• Lubricate every 6 months.**			○	○	○
Fittings and Fasteners*	• Check all chassis fittings and fasteners. • Correct if necessary.	○	○	○	○	○
Battery*	• Check specific gravity. • Check breather pipe for proper operation. • Correct if necessary.	○	○	○	○	○

\*: It is recommended that these items be serviced by a Yamaha dealer.

\*\*: Lithium soap base grease.

### WARNING

**Indicates a potential hazard that could result in serious injury or death.**

3



## FENDER AND FUEL TANK

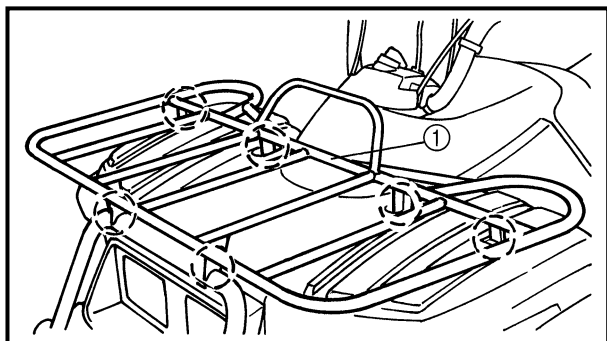
### FRONT FENDER

#### Removal

1. Place the machine on a level place.

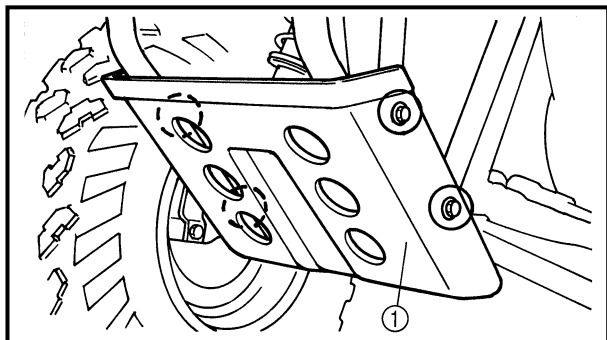
2. Remove:

- Front carrier ①



3. Remove:

- Front bumper skid plate ①

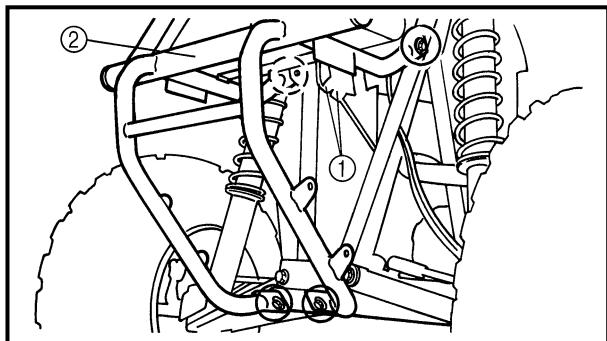


4. Disconnect:

- Dual headlight leads ①

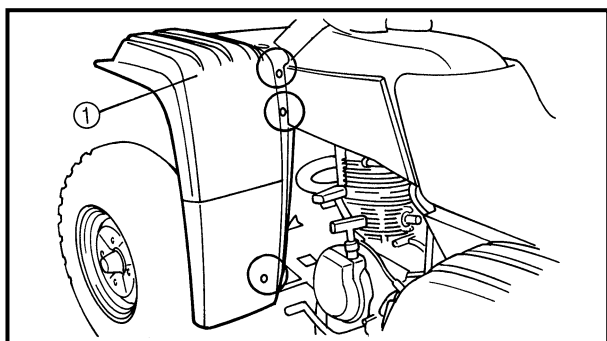
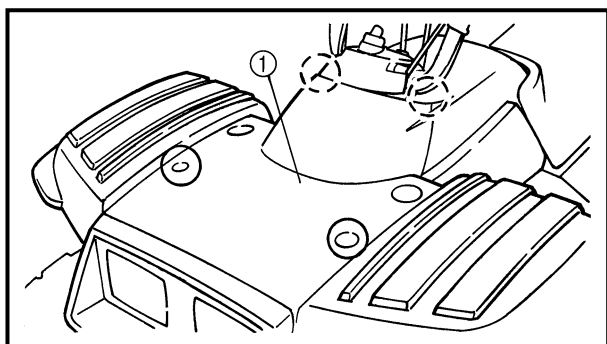
5. Remove:

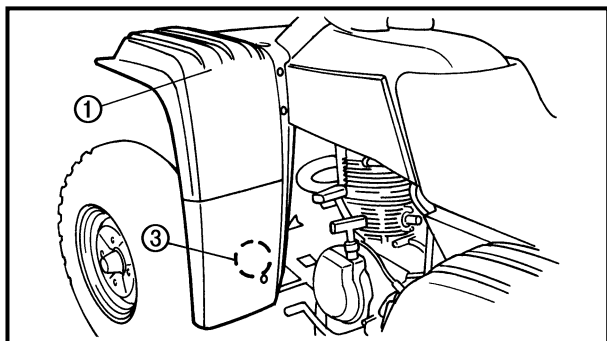
- Front bumper ②



6. Remove:

- Front fender ①





## Installation:

Reverse the "Removal" procedures.

Note the following points.

1.Install:

- Front fender ①

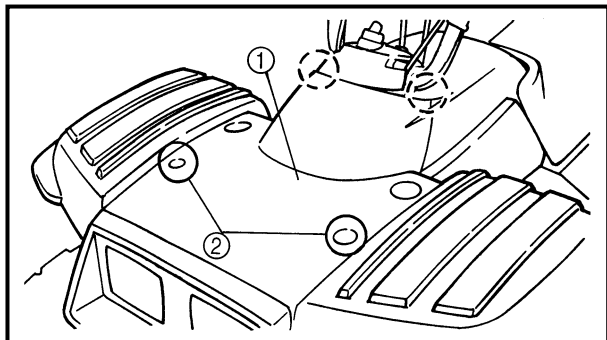


**Bolt ② (front fender and frame):**

7 Nm (0.7 m • kg, 5.1 ft • lb)

**Nut ③ (front fender and fender stay):**

7 Nm (0.7 m • kg, 5.1 ft • lb)



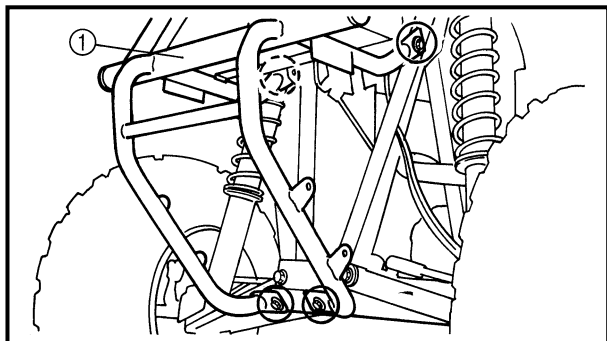
2.Install:

- Front bumper ①



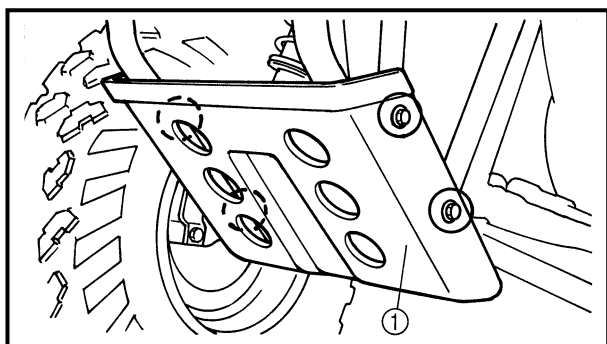
**Bolt (front bumper and frame):**

16 Nm (1.6 m • kg, 12 ft • lb)



3.Install:

- Front bumper skid plate ①



4.Install:

- Front carrier ①

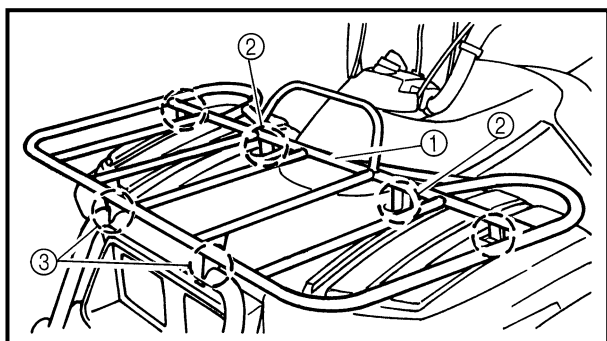


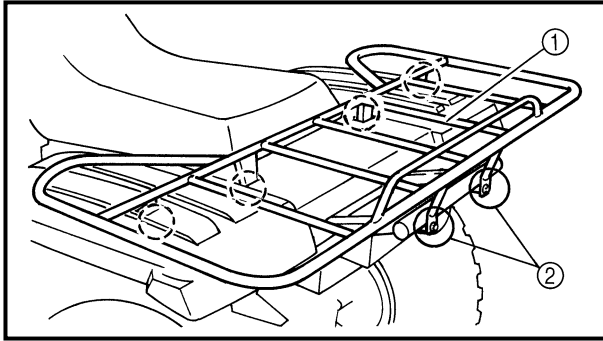
**Bolt ② (front carrier and frame):**

34 Nm (3.4 m • kg, 25 ft • lb)

**Nut ③ (front carrier and front bumper)**

11 Nm (1.1 m • kg, 8.0 ft • lb)





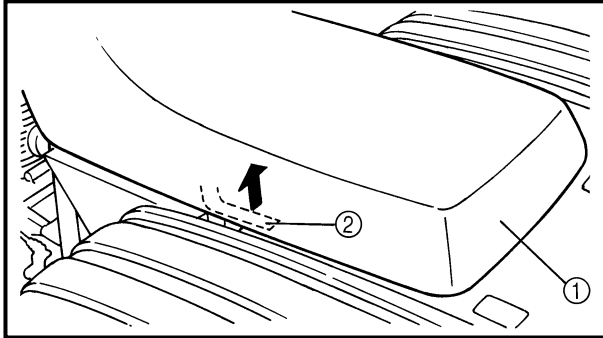
## REAR FENDER

### Removal

1.Place the machine on a level place.

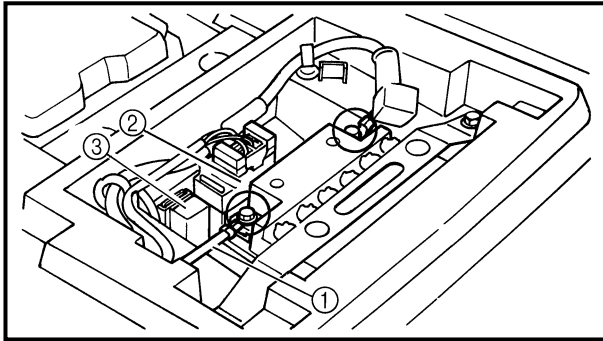
2.Remove:

- Rear carrier ①
- ② with spacer



3.Remove:

- Seat ①
- Pull up the seat lock lever ②, then pull up the seat at the rear.



4.Disconnect:

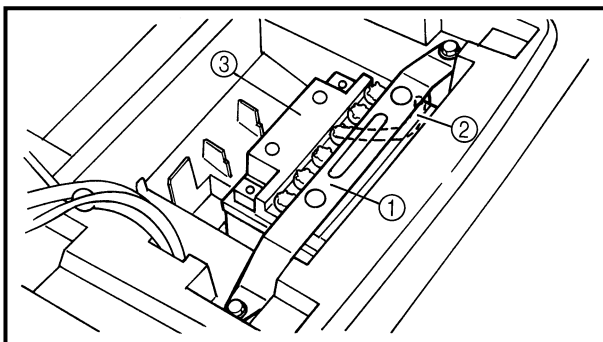
- Battely leads (negative and positive)

### ⚠ WARNING

**Disconnect the negative lead ① first.**

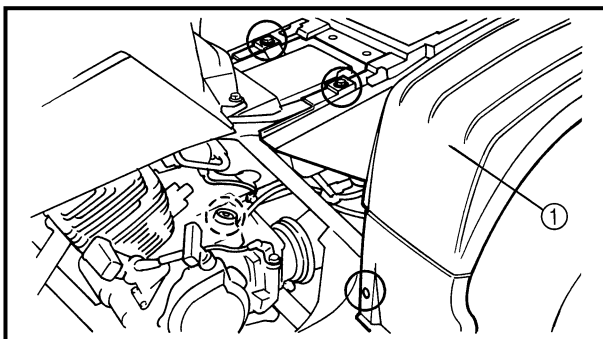
5.Remove:

- Starter relay ②
- Starting circuit cut-off relay ③



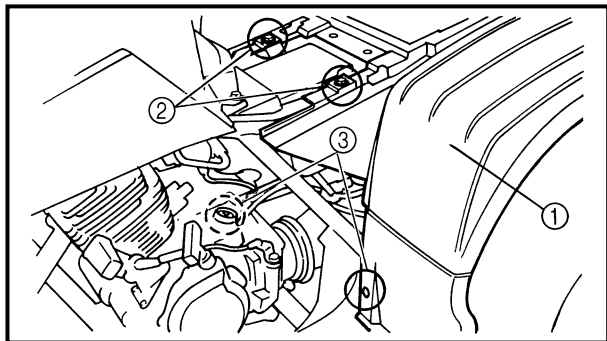
6.Remove:

- Battery bracket ①
- Battery breather hose ②
- Battery ③



7.Remove:

- Rear fender ①



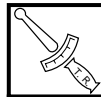
## Installation

Reverse the "Removal" procedure.

Note the following points.

1.Install:

- Rear fender ①



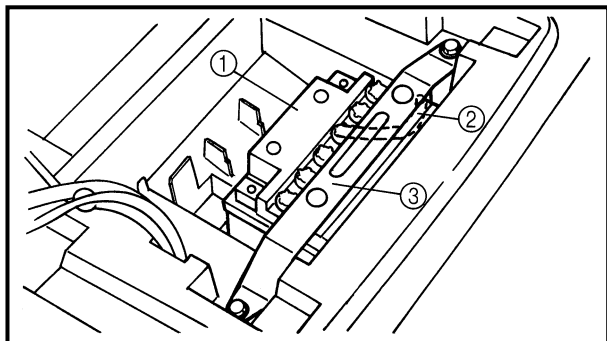
**Bolt ② (rear fender and frame):**

7 Nm (0.7 m • kg, 5.1ft • lb)

**Bolt ③ (rear fender and rear foot-rest plate):**

7 Nm (0.7 m • kg, 5.1ft • lb)

# 3

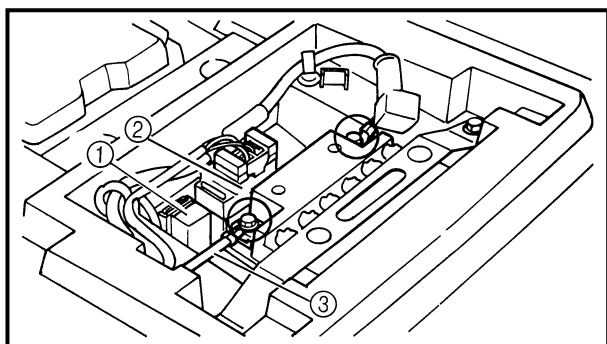


2.Install:

- Battery ①
- Battery breather hose ②
- Battery bracket ③

## CAUTION:

**When installing the battery, be sure the breather hose is routed correctly. Refer to the "BATTERY INSPECTION" section.**



3.Install:

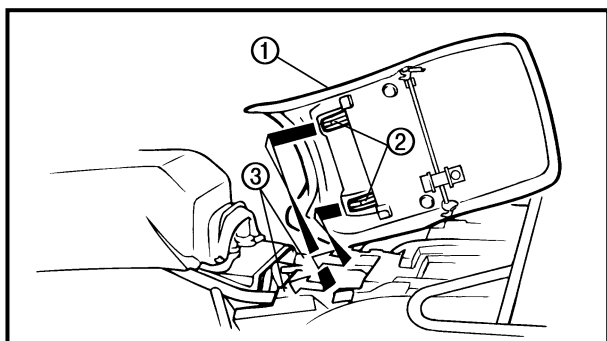
- Starting circuit cut-off relay ①
- Starter relay ②

4.Connect:

- Battery leads (positive and negative)

## ⚠ WARNING

**Connect the positive lead ③ first.**



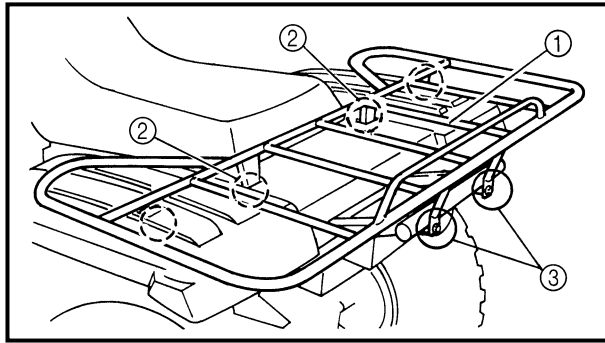
5.Install:

- Seat ①

## NOTE:

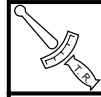
Insert the lobes ② on the seat front into the receptacle ③ on the frame, then push down the seat at the rear.





## 6.Install:

- Rear carrier ①



**Bolt ② (rear carrier and frame):**  
34 Nm (3.4 m • kg, 25 ft • lb)

**Bolt ③ (rear carrier and rear bumper):**  
9 Nm (0.9 m • kg, 6.5 ft • lb)

## NOTE:

Do not forget to attach the spacer at the point where the carrier and bumper are connected.

3

## FUEL TANK

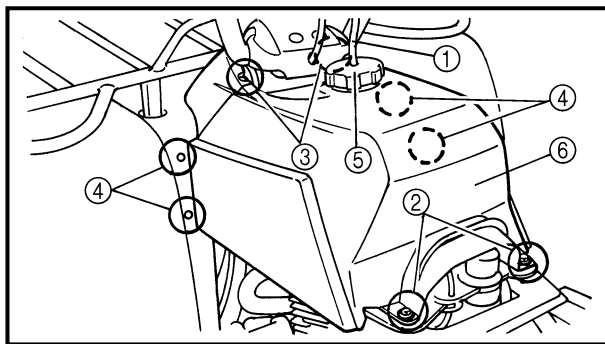
### Removal

1.Place the machine on a level place.

2.Remove:

- Seat

Refer to the "REAR FENDER – Removal" section.

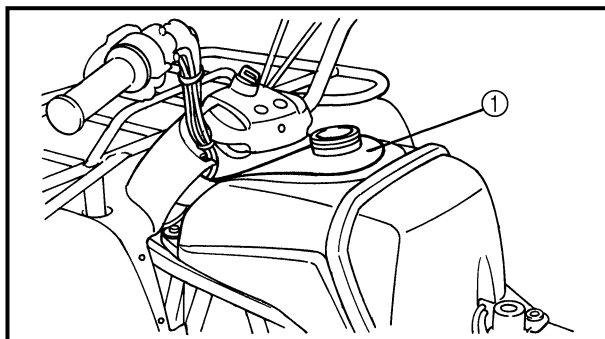


3.Disconnect:

- Breather hose ① (tank cap side)

4.Remove:

- Bolt ② (with flange collar)
- Screw ③
- Rivet ④
- Fuel tank cap ⑤
- Fuel tank cover ⑥

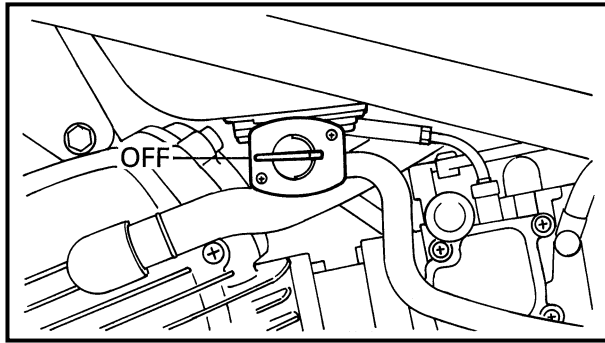


5.Remove:

- Damper plate ①

## NOTE:

After removing the damper plate, immediately install the tank cap on the fuel tank.



6. Turn the fuel cock lever to "OFF" position.

7. Disconnect:

- Fuel hose ①

## NOTE:

Place a rug on the engine to absorb a spilt fuel.

## ⚠ WARNING

- Gasoline is highly flammable.
- Avoid spilling fuel on the hot engine.

8. Remove:

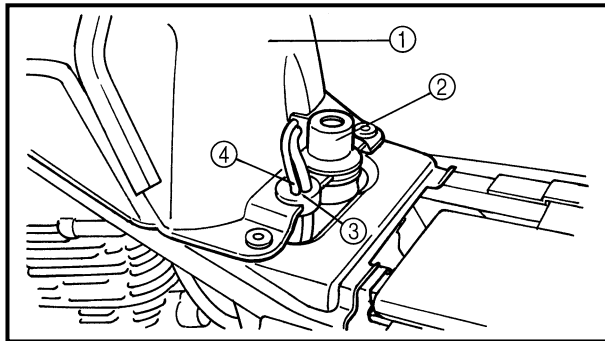
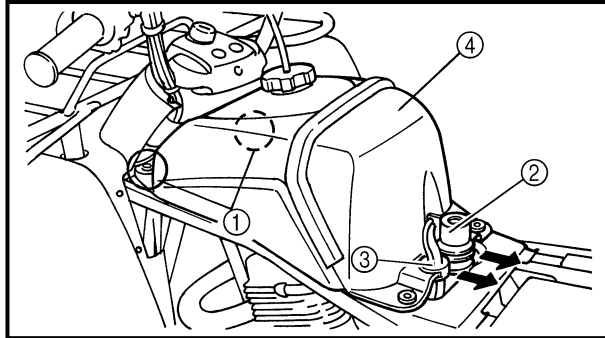
- Bolt ① (with washer and collar)

9. Disconnect:

- Air duct ② (with hoses)
- Grommet ③ (with hoses)

10. Remove:

- Fuel tank ④



## Installation

Reverse the "Removal" procedures.

Note the following points.

1. Install:

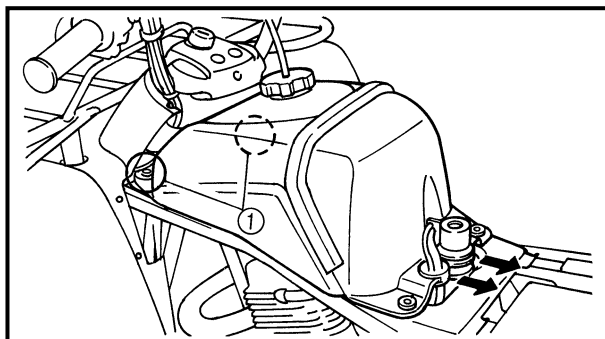
- Fuel tank ①

2. Connect:

- Air duct ② (with hoses)
- Grommet ③ (with hoses)

## NOTE:

When installing the grommet, the projection ④ should be positioned forward.

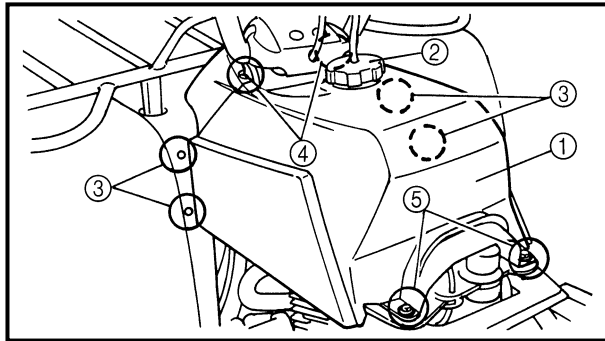


3. Install:

- Bolt ① (with washer and collar)



**Bolt (fuel tank and frame):**  
10 Nm (1.0 m • kg, 7.2 ft • lb)



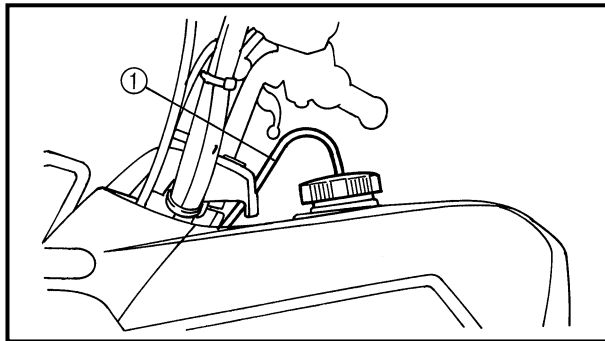
## 4.Install:

- Fuel tank cover ①
- Fuel tank cap ②
- Rivet ③
- Screw ④
- Bolt ⑤ (with flange collar)



**Bolt (fuel tank cover and frame):**  
**10 Nm (1.0 m • kg, 7.2 ft • lb)**

3



## 5.Connect:

- Breather hose ①

## 6.Install:

- Seat  
Refer to the “REAR FENDER-Installation” section.

## ENGINE

### VALVE CLEARANCE ADJUSTMENT

#### NOTE:

- The valve clearance must be adjusted when the engine is cool to the touch.
- Adjust the valve clearance when the piston is at the Top Dead Center (T.D.C.) on compression stroke.

#### Removal

1.Place the machine on a level place.

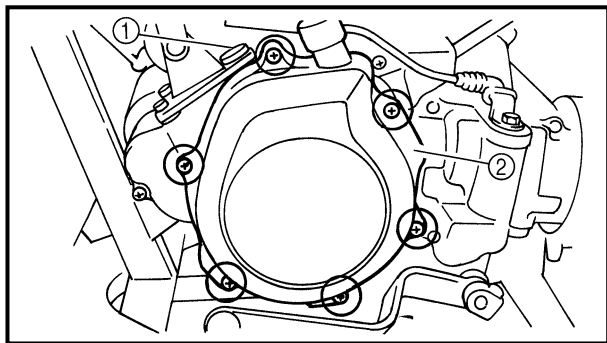
2.Remove:

- Seat
- Fuel tank cover
- Fuel tank

Refer to the "FUEL TANK - Removal" section.

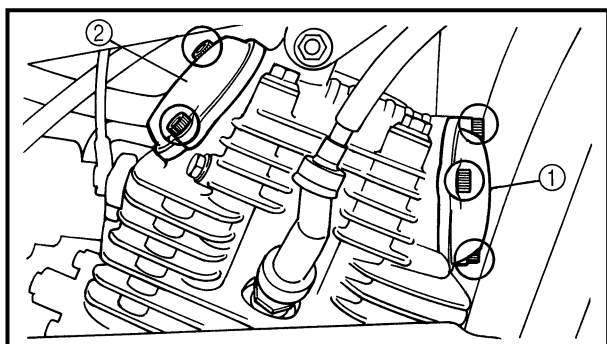
3.Remove:

- Timing plug ①
- Recoil starter assembly ②



4.Remove:

- Tappet cover ① (exhaust)
- Tappet cover ② (intake)



#### Adjustment

1.Measure:

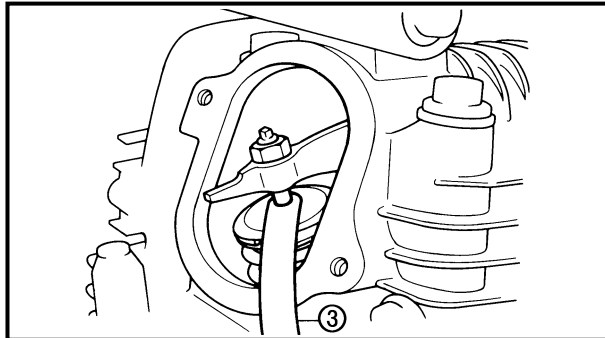
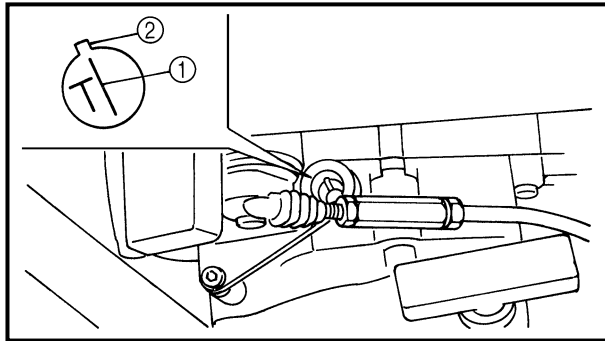
- Valve clearance

\*\*\*\*\*

#### Measurement steps:

- Turn the crank shaft counterclockwise with the wrench.

# VALVE CLEARANCE ADJUSTMENT



- Align the "T" mark ① on the flywheel with the stationary pointer ② on the crankcase cover. When the "T" mark is aligned with the stationary pointer, the piston is at Top Dead Center (TDC).

## NOTE:

T.D.C. on compression stroke check:

- Both rocker arms must have a valve clearance when the rotor match mark ① is aligned with the stationary pointer match mark ②.
- If not, give the crankshaft one counter-clockwise turn to meet above condition.

- Measure the valve clearance using a Feeler Gauge ③.

Out of specification → Adjust clearance.



**Intake valve (cold):**

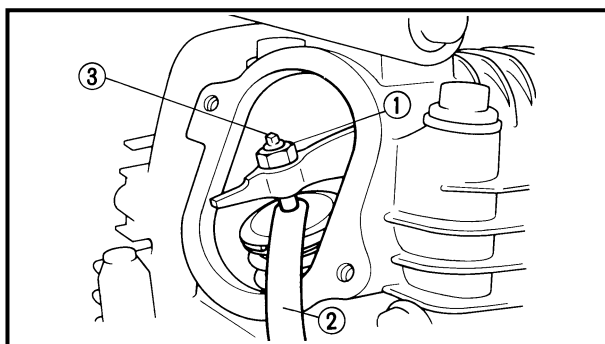
0.05 ~ 0.09 mm (0.002 ~ 0.004 in)

**Exhaust valve (cold):**

0.11 ~ 0.15 mm (0.004 ~ 0.006 in)

\*\*\*\*\*

3



## 2.Adjust:

- Valve clearance

\*\*\*\*\*

## Valve clearance adjustment steps:

- Loosen the locknut ①.
- Insert a Feeler Gauge ② between the adjuster end and the valve stem end.
- Turn the adjuster ③ clockwise or counter-clockwise with the Valve Adjusting Tool until proper clearance is obtained.



**Valve adjusting tool 3 mm (0.12 in):**

P/N. YM-08035, 90890-01311

- Hold the adjuster to prevent it from moving and thoroughly tighten the locknut.

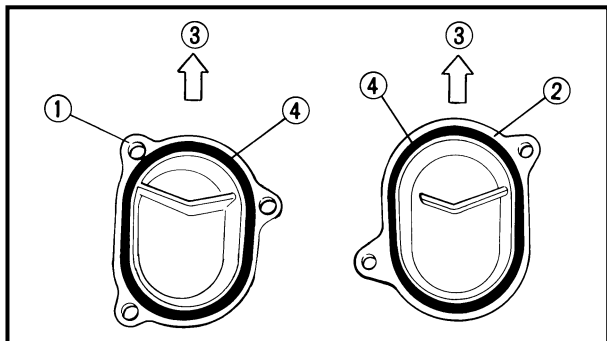
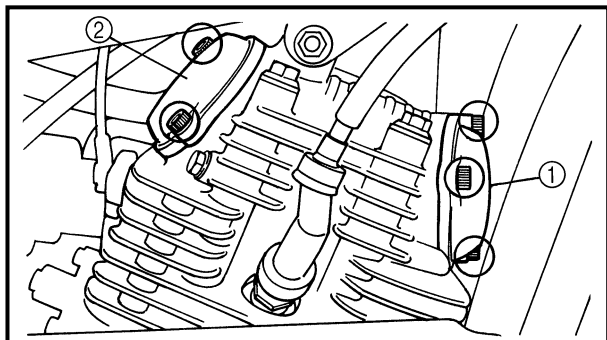


**Valve clearance adjusting locknut:**

14 Nm (1.4 m • kg, 10 ft • lb)

- Once again, measure the valve clearance.
- If the clearance is incorrect, repeat above steps until the proper clearance is obtained.

\*\*\*\*\*



## Installation

Reverse the "Removal" procedure. Note the following points.

### 1.Install:

- Tappet cover ① (exhaust)
- Tappet cover ② (intake)

### NOTE:

- Install the tappet covers with its ridge facing upward ③.
- Check the O-ring ④ for damage. If damaged, replace.

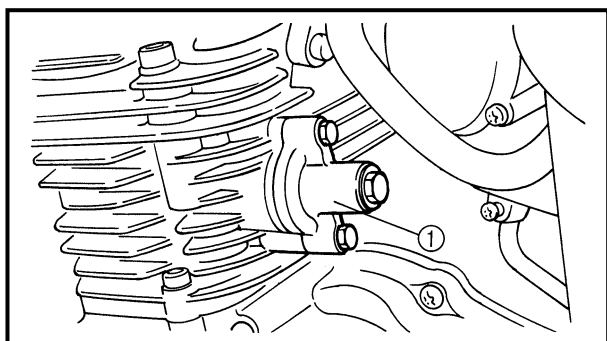


**Tappet cover:**  
**10 Nm (1.0 m • kg, 7.2 ft • lb)**

### 2.Install:

- Fuel tank
- Fuel tank cover
- Seat

Refer to the "FUEL TANK - Installation" section.



## TIMING CHAIN TENSIONER ADJUSTMENT

This model has been equipped the automatic timing chain tensioner ①. No adjustment is necessary.

## IDLE SPEED ADJUSTMENT

- 1.Place the machine on a level place.
- 2.Warm up engine for several minutes.
- 3.Adjust:

- Engine idle speed

\*\*\*\*\*

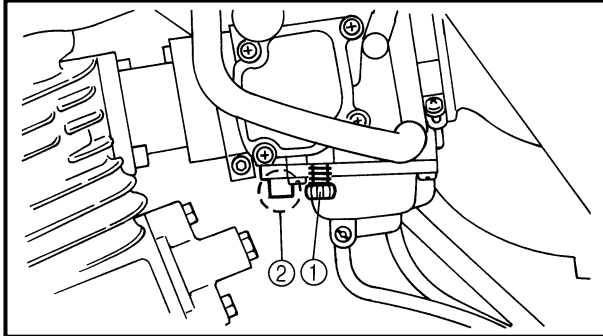
### Adjustment steps:



- Turn the pilot screw ① clockwise until it is lightly seated.
- Loosen the pilot screw by turning it counterclockwise for the specified number of turns.

#### Pilot screw:

**2 counterclockwise turns**

- Turn the throttle stop screw ② until the Idle speed is in the specified range. Use the Inductive Tachometer to confirm the engine speed.



Clockwise	Idle speed becomes higher.
Counterclockwise	Idle speed becomes lower.
	<b>Inductive tachometer:</b> <b>P/N. YU-08036-A, 90890-03113</b>
	<b>Engine idle speed:</b> <b>1,400 ~ 1,500 r/min</b>

- Turn the pilot screw ① again clockwise or counterclockwise in 1/8-turn increments to achieve the highest speed with just the pilot screw.
- Once again, turn the throttle stop screw ② to attain the specified idle speed.

\*\*\*\*\*

### 4.Check:

- Throttle cable free play  
Refer to "THROTTLE CABLE FREE PLAY ADJUSTMENT" section.

## THROTTLE CABLE FREE PLAY ADJUSTMENT

### NOTE:

Before adjusting the throttle cable free play, the engine idle speed should be adjusted.

1.Place the machine on a level place.

2.Check:

- Throttle cable free play ①
- Out of specification → Adjust.



**Throttle cable free play:**  
3 ~ 5mm (0.12 ~ 0.20 in)

3.Adjust:

- Throttle cable free play

### NOTE:

If the throttle cable free play can not be adjusted on the carburetor side, adjust it on the throttle housing side.

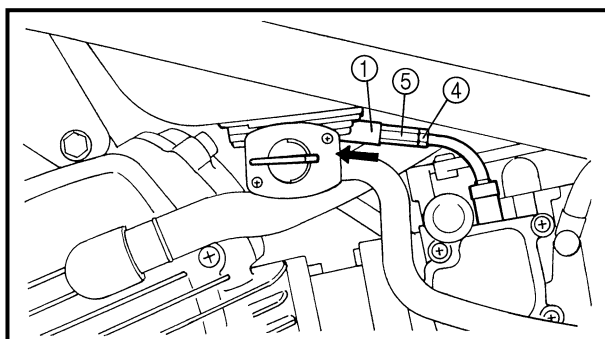
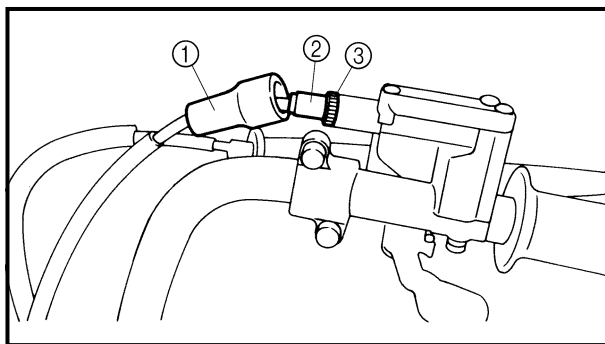
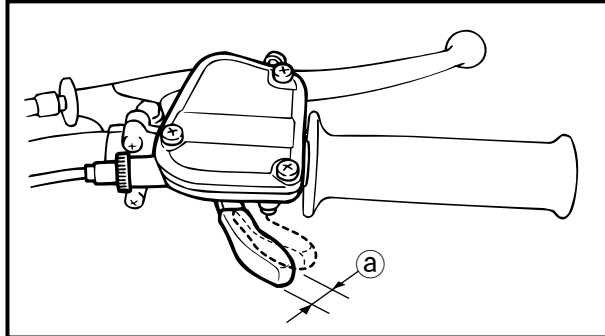
\*\*\*\*\*

### Adjustment steps:

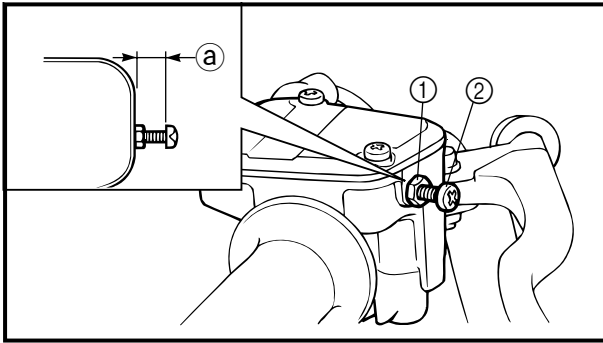
- Pull back the adjuster covers ① from the both side (throttle housing and carburetor).
- Make sure that the adjuster ② and locknut ③ on the throttle housing side are fully tightened.
- Loosen the locknut ④ on the carburetor side.
- Turn the adjuster ⑤ clockwise or counterclockwise until the proper free play is obtained.

Clockwise	Free play is increased.
Counterclockwise	Free play is decreased.

- Tighten the locknut.
- Reset the adjuster covers.







## ⚠ WARNING

After adjusting the free play, turn the handlebar to right and left, and make sure that the engine idling does not run faster.

\*\*\*\*\*

## SPEED LIMITER ADJUSTMENT

The speed limiter keeps the carburetor throttle from becoming full-open even when the throttle lever is pushed to a maximum. Screwing in the adjuster stops the engine speed from increasing.

1.Adjust:

- Speed limiter length ①

\*\*\*\*\*

## Adjustment steps:

- Loosen the locknut ①.
- Turn the adjuster ② clockwise or counter-clockwise until the proper length is attained.



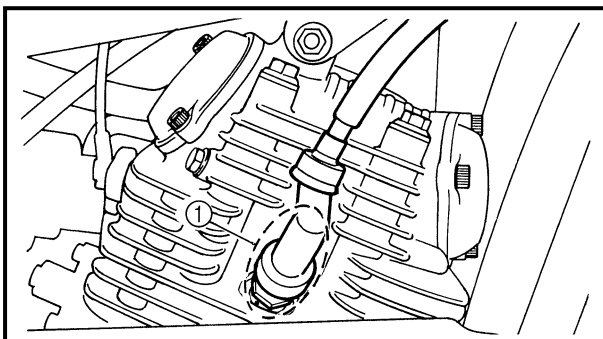
**Speed limiter standard length:**  
12 mm (0.47 in)

- Tighten the locknut.

## ⚠ WARNING

- Particularly for a beginner rider, the speed limiter should be screwed in completely. Screw it out little by little as riding technique improves. Never remove the speed limiter from the outset.
- For proper throttle lever operation do not turn out the adjuster more than 12 mm (0.47 in). Also adjust the throttle lever free play always to 3 ~ 5 mm (0.12 ~ 0.20 in).

\*\*\*\*\*



## SPARK PLUG INSPECTION

1.Place the machine on a level place.

2.Remove:

- Spark plug ①

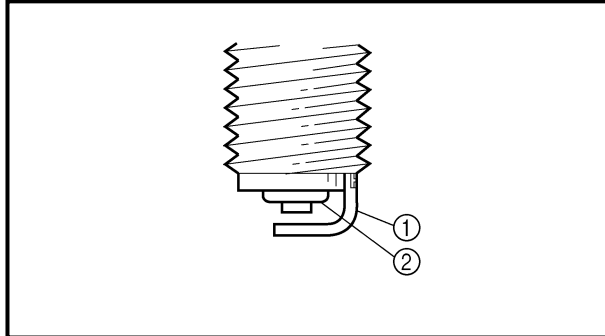
## CAUTION:

Before completely removing plug, use compressed air to clean the setting areas to prevent dirt particles from falling into the engine.

## 3. Inspect:

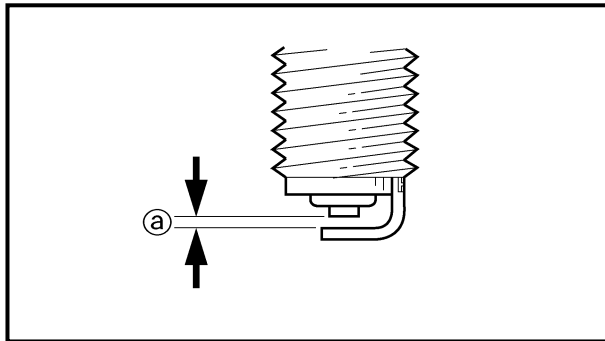
- Spark plug type  
Incorrect → Replace.

**Standard spark plug:**  
**DR7EA (NGK)**



## 4. Inspect:

- Electrode ①  
Wear/Damage → Replace.
- Insulator color ②  
Normal condition is a medium to light tan color.  
Distinctly different color → Check the engine condition.



## 5. Clean:

- Spark plug  
Clean the spark plug with a spark plug cleaner or wire brush.

## 6. Measure:

- Spark plug gap ③  
Out of specification → Regap.  
Use a wire gauge.



**Spark plug gap:**  
**0.6 ~ 0.7 mm (0.024 ~ 0.028 in)**

## 7. Tighten:

- Spark plug

## NOTE:

- Before installing a spark plug, clean the gasket surface and plug surface.
- Finger-tighten the spark plug before torquing to specification.



**Spark plug:**  
**17.5 Nm (1.75 m • kg, 12.5 ft • lb)**

## IGNITION TIMING CHECK

### NOTE:

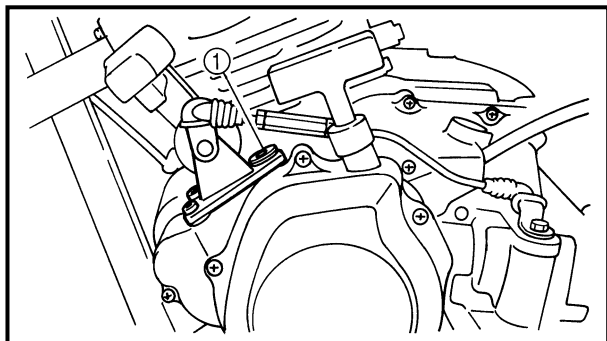
Engine idling speed and throttle cable free play should be adjusted properly before checking the ignition timing.

1. Place the machine on a level place.
2. Start the engine and let it warm up for several minutes, then stop the engine.
3. Attach:
  - Inductive tachometer
  - Timing light to spark plug lead.



**Inductive tachometer:**  
P/N. YU-08036-A, 90890-03113  
**Timing light:**  
P/N. YM-33277-A, 90890-03141

3



4. Check:
  - Ignition timing

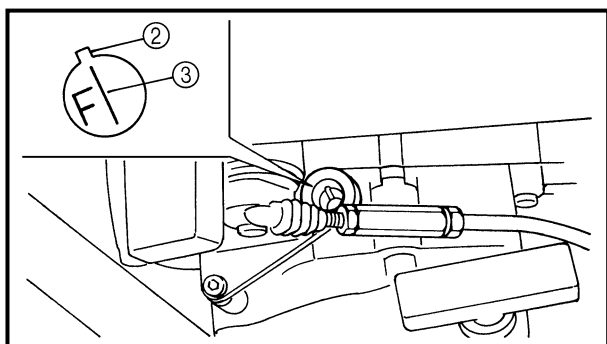
\*\*\*\*\*

### Checking steps:

- Remove the timing plug ①.
- Start the engine and let it idle at the specified idle speed.



**Idle speed:**  
1,400 ~ 1,500 r/min



### CAUTION:

Under extreme conditions, the oil may spurt out when running the engine. Therefore care should be used when running.

- Visually check the stationary pointer ② on the crankcase cover to verify it is within the firing range ③ indicated on the flywheel.  
Incorrect → Check flywheel and/or pulser coil assembly (tightness and/or damage). Refer to "CHAPTER 8. ELECTRICAL" section further information.

### NOTE:

Ignition timing is not adjustable.

\*\*\*\*\*

3

5. Install:
  - Timing plug
6. Detach:
  - Timing light
  - Inductive tachometer

## COMPRESSION PRESSURE MEASUREMENT

### NOTE:

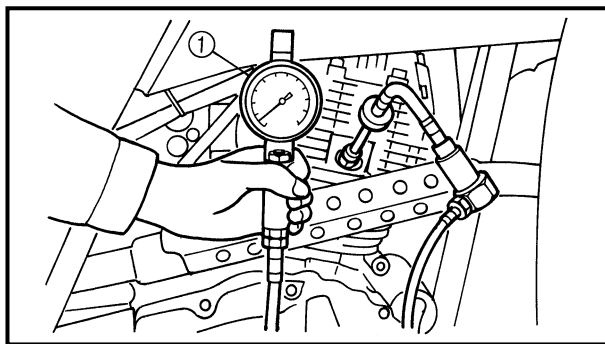
- Insufficient compression pressure will result in performance loss.
- Before measuring the compression pressure, the valve clearance should be adjusted.  
Refer to "VALVE CLEARANCE ADJUSTMENT" section.

1. Place the machine on a level place.
2. Remove:
  - Spark plug
3. Measure:
  - Compression pressure

\*\*\*\*\*

### Measurement steps:

- Install the Compression Gauge ①.



**Compression gauge:**  
P/N. YU-33223, 90890-03081  
**Adapter:**  
P/N. YU-33223-3, 90890-04082

- Crank over the engine with the electric starter (be sure the battery is fully charged) with the throttle wide-open until the compression reading on the gauge stabilizes.

### ⚠ WARNING

**When cranking the engine, ground the spark plug lead to prevent sparking.**

- Check readings with specified levels (see chart).

**Compression pressure (at sea level):**  
Standard: 900 kPa (9.0 kg/cm<sup>2</sup>, 128 psi)  
Minimum: 800 kPa (8.0 kg/cm<sup>2</sup>, 114psi)  
Maximum: 1,000 kPa (10 kg/cm<sup>2</sup>, 142 psi)

- If pressure falls below the minimum level:
  - 1) Squirt a few drops of oil into the affected cylinder.
  - 2) Measure the compression again.


Compression pressure (with oil introduced into cylinder)	
Reading	Diagnosis
Higher than without oil	Worn or damaged cylinder or rings
Same as without oil	Defective ring(s), valves, cylinder head gasket.
Above maximum level	Inspect cylinder head, valve surface, or piston crown for carbon deposit.

- Remove the compression gauge.

\*\*\*\*\*

## 4.Install:

- Spark plug



**Spark plug:**  
**17.5 Nm (1.75 m • kg, 12.5 ft • lb)**

Refer to "SPARK PLUG INSPECTION" section.

## ENGINE OIL LEVEL INSPECTION

### CAUTION:

- Do not add any chemical additives. Engine oil also lubricates the clutch and additives could cause clutch slippage.
- Do not allow foreign material to enter the crankcase.

1.Place the machine on a level place.

## 2.Inspect:

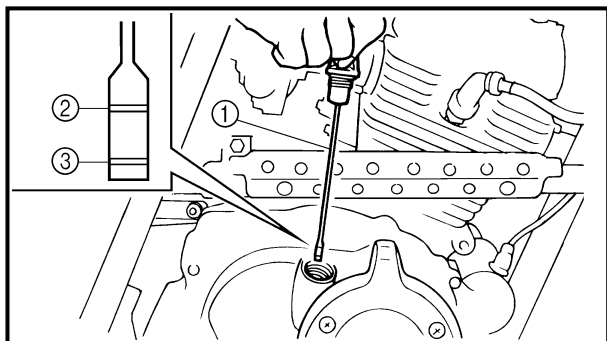
- Engine oil level  
Oil level low → Add sufficient oil

\*\*\*\*\*

## Inspection steps:

- Warm up the engine for several minutes, and stop it, then wait at least several minutes for the oil to drain back into the crankcase.

# ENGINE OIL LEVEL INSPECTION/ ENGINE OIL REPLACEMENT



- Screw the dipstick ① completely out, and wipe the dipstick clean, then just rest the dipstick in the hole.
- Pull up the dipstick, and inspect the oil level whether or not it is between maximum ② and minimum level ③.
- If the level is lower, add the oil up to the proper level.



**Recommended oil:**  
Follow the left chart.

## NOTE:

Recommended oil classification:  
API service "SE", "SF" type or equivalent  
(e.g. "SF-SE-CC", "SF-SE-SD" etc.)

## CAUTION:

**Do not allow foreign material to enter the crankcase.**

\*\*\*\*\*

## ENGINE OIL REPLACEMENT

## CAUTION:

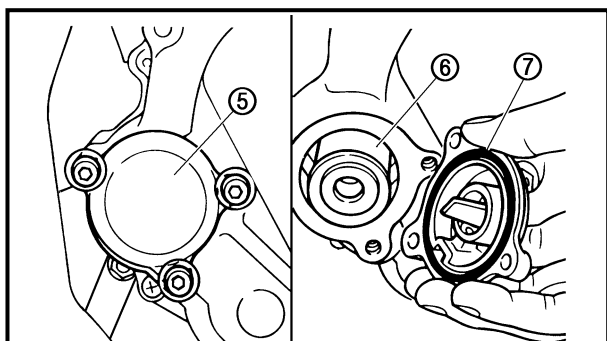
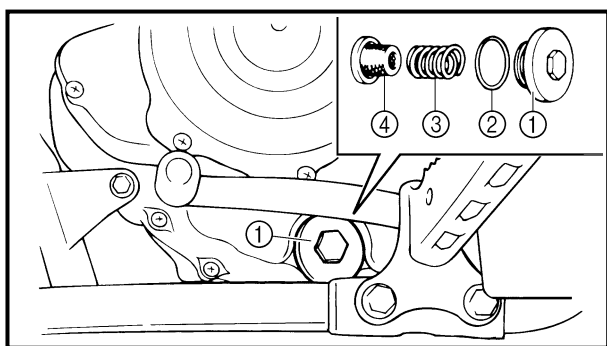
- Do not add any chemical additives. Engine oil also lubricates the clutch and additives could cause clutch slippage.
- Do not allow foreign material to enter the crankcase.

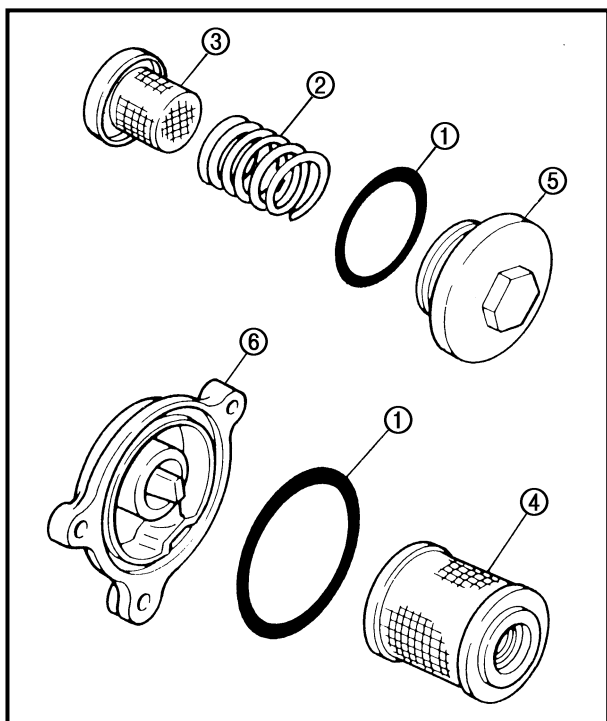
- 1.Place the machine on a level place.
- 2.Warm up the engine for several minutes, and stop it.
- 3.Place an oil pan under the engine.
- 4.Remove:
  - Dipstick
  - Drain plug ① (crankcase)  
Drain the engine oil.

## CAUTION:

**When removing the drain plug (crankcase) the compression spring ③, oil strainer ④ and O-ring ② will fall off. Take care not to lose these parts.**

- 5.Remove:
  - Oil filter cover ⑤
  - Oil filter ⑥
  - O-ring ⑦





## 6. Inspect:

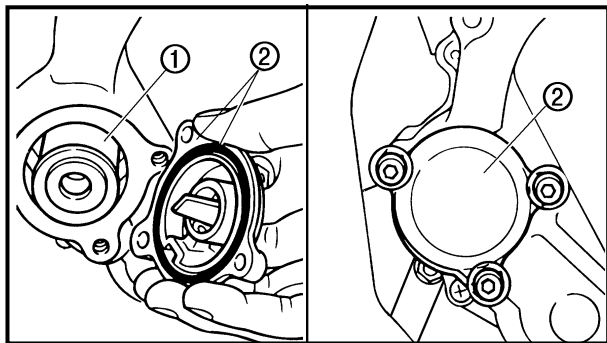
- O-rings ①
- Compression spring ②
- Oil strainer ③
- Oil filter ④
- Damage → Replace.

## 7. Clean:

- Compression spring ②
- Oil strainer ③
- Oil filter ④
- Drain plug ⑤ (crankcase)
- Oil filter cover ⑥
- Wash them with a cleaning solvent.

## 8. Apply:

- Engine oil (light coating)  
(to the O-rings)

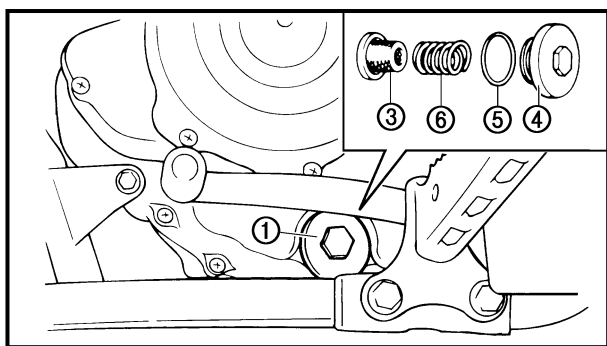


## 9. Install:

- Oil filter ①
- Oil filter cover ② (with O-ring)
- Oil strainer ③
- Drain plug ④ (crankcase)

## CAUTION:

Before reinstalling the drain plug (crankcase), do not forget to fit the O-ring ⑤, compression spring ⑥ and oil strainer. Be sure you fit each item in the correct position and order.



### Oil filter cover:

10 Nm (1.0 m • kg, 7.2 ft • lb)

### Drain plug (crankcase):

43 Nm (4.3 m • kg, 31 ft • lb)

## 10. Fill:

- Crankcase

Refer to "ENGINE OIL LEVEL INSPECTION" section.



### Total amount:

1.8 L (1.6 Imp qt, 1.9 US qt)

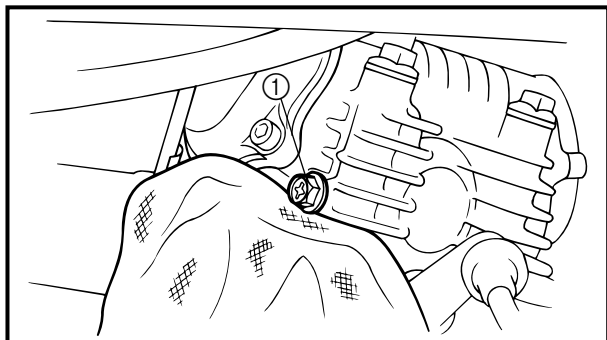
### Periodic oil change:

1.5 L (1.3 Imp qt, 1.6 US qt)

### With oil filter cleaning/replacement:

1.6 L (1.4 Imp qt, 1.7 US qt)

3



11.Install:

- Dipstick

12.Warm up the engine for 5 minutes or more, and stop it.

13.Inspect:

- Oil leaks
- Oil level

14.Inspect:

- Oil flow

\*\*\*\*\*

## Inspection steps:

- Slightly loosen the oil gallery plug ① in the cylinder head.
- Start the engine and keep it idling until oil begins to seep from the oil gallery plug. If no oil comes out after one minutes, stop the engine immediately so it will not engine stick.
- Restart the engine after solving the problem(s), and recheck the oil pressure.
- Tighten the oil gallery plug to specification.



**Oil gallery plug:**  
**7 Nm (0.7 m • kg, 5.1 ft • lb)**

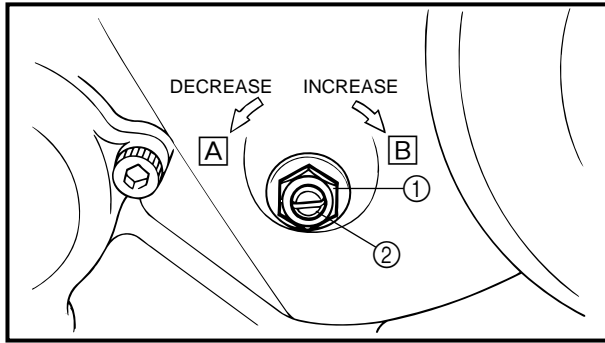
\*\*\*\*\*

15.Adjust:

- Rear brake

Refer to “REAR BRAKE LEVER AND PEDAL ADJUSTMENT” section.





## CLUTCH ADJUSTMENT

### Release lever free play adjustment

#### 1.Adjust:

- Release lever free play

\*\*\*\*\*

#### Adjustment steps:

- Loosen the locknut ①.
- Slowly turn the adjuster ② counterclockwise until resistance is felt, then turn back it 1/8 clockwise, hold the adjuster ② in this position and tighten the locknut ①.

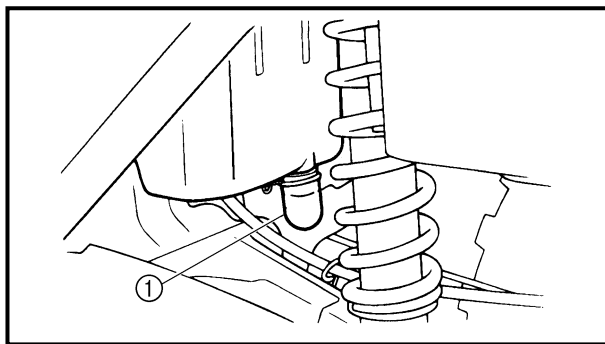
#### NOTE:

Turn the adjuster counterclockwise ("DECREASE" direction) A to decrease the clutch free play and turn it clockwise ("INCREASE" direction) B to increase the free play.



**Locknut (clutch release adjuster):**  
**15 Nm (1.5 m • kg, 11 ft • lb)**

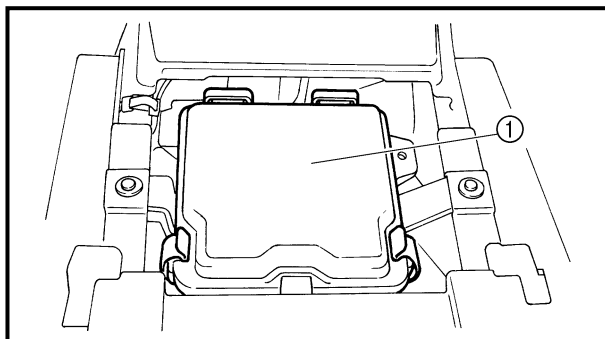
\*\*\*\*\*



## AIR FILTER CLEANING

#### NOTE:

There is check hose ① at the bottom of the air filter case. If dust and/or water collects in this hose, clean the air filter element and air filter case.

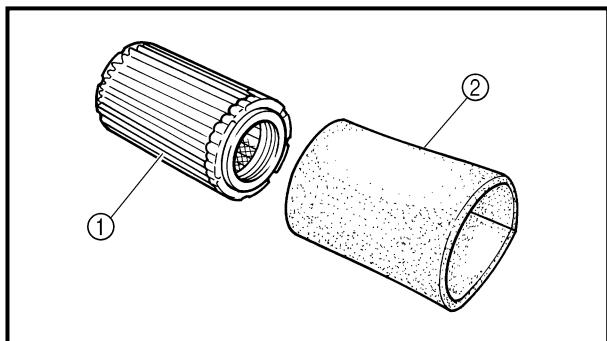


#### 1.Remove:

- Seat  
Refer to "REAR FENDER-Removal" section.

#### 2.Remove:

- Cover ① (air filter case)
- Air filter assembly



## 3.Remove:

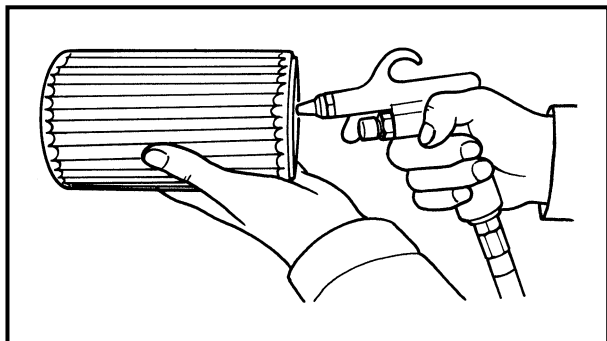
- Air filter element ①
- Foam cover ②

### CAUTION:

The engine should never be run without the air filter; excessive piston and/or cylinder wear may result.

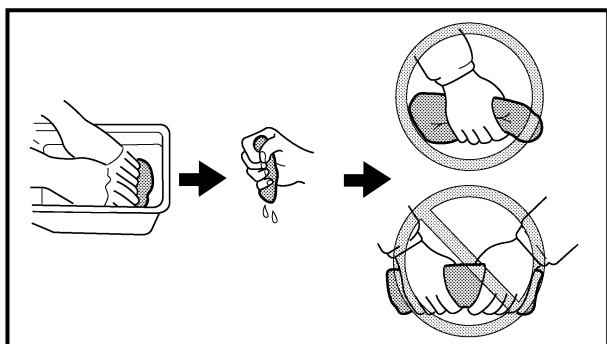
## 4.Inspect:

- Air filter element ①
  - Foam cover ②
- Damage → Replace.



## 5.Clean:

- Air filter element
- Use compressed air to blow off dust from the inner surface of the element.



## 6.Clean:

- Foam cover

\*\*\*\*\*

### Cleaning steps:

- Wash the foam cover gently, but thoroughly in water ①.
- Squeeze the excess water out of the foam cover and let dry.

### CAUTION:

Do not twist the foam cover when squeezing the foam cover.

\*\*\*\*\*

7.Install:

- Foam cover (to air filter)

8.Install:

- Air filter assembly

**NOTE:** \_\_\_\_\_

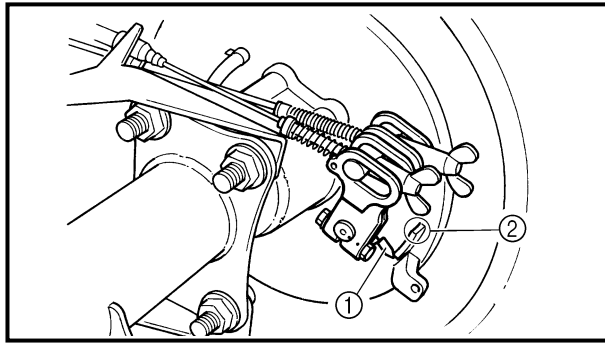
Make sure its sealing surface matches the sealing surface of the case so there is no air leak.

---

9.Install:

- Cover (air filter case)
- Seat

Refer to "REAR FENDER-Installation" section.



## CHASSIS

### FRONT AND REAR BRAKE LINING INSPECTION

#### Front brake

1. Apply the front brake.

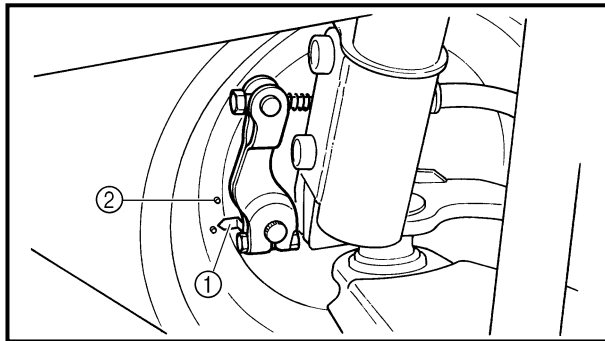
2. Inspect:

- Wear indicator ①

Indicator reaches the wear limit mark ②

→ Replace brake shoes as a set.

Refer to the "FRONT WHEEL AND FRONT BRAKE" section in CHAPTER 7.



#### Rear brake

1. Depress the Rear brake pedal.

2. Inspect:

- Wear indicator ①

Indicator reaches the wear limit mark ②

→ Replace brake shoes as a set.

Refer to the "REAR BRAKE" section in CHAPTER 7.

### FRONT BRAKE ADJUSTMENT

#### NOTE:

Before adjusting the front brake, the front brake linings should be inspected.

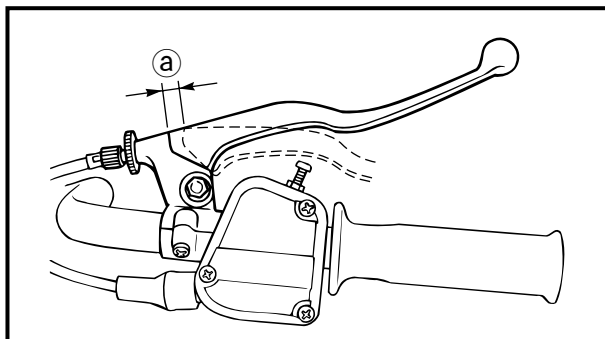
#### CAUTION:

**Proper lever free play is essential to avoid excessive brake drag.**

1. Check:

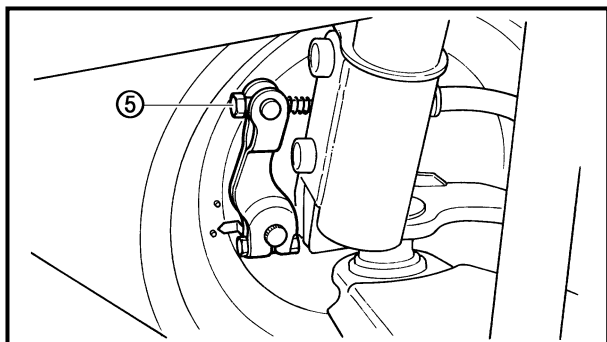
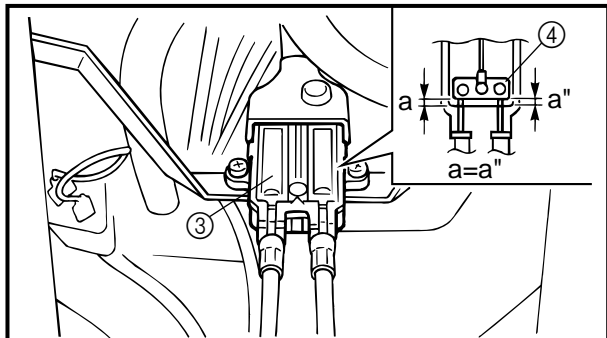
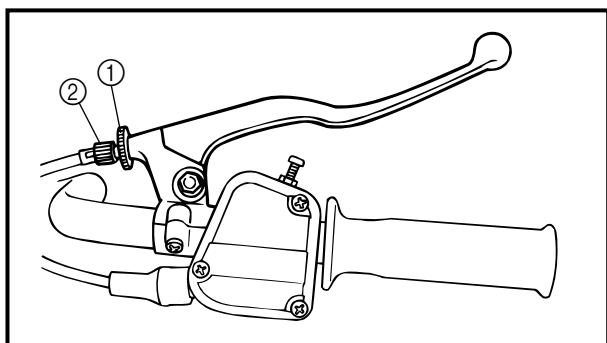
- Front brake lever free play ①

Out of specification → Adjust.



**Front brake lever free play:**  
5 ~ 7 mm (0.20 ~ 0.28 in) at lever  
pivot

## FRONT BRAKE ADJUSTMENT/ REAR BRAKE LEVER AND PEDAL ADJUSTMENT



### 2.Adjust:

- Front brake lever free play

\*\*\*\*\*

### Adjustment steps:

- Loosen the locknut (1) and turn the adjuster (2) clockwise to release the tension in the front brake cable.
- Visually check the cable joint (3) in the equalizer (4) to verify it is horizontal.
- If not horizontal, turn both adjuster (5) (Front hub — left and right) until the cable joint (3) is horizontal.
- Make sure that the both brakes (left and right) have some slight drag by lifting the front wheels off the ground, then spin the wheels.
- Turn the adjuster (2) clockwise or counter-clockwise until proper free play is obtained.

Clockwise	Free play is increased.
Counterclockwise	Free play is decreased.

- Tighten the locknut.

\*\*\*\*\*

## REAR BRAKE LEVER AND PEDAL ADJUSTMENT

### NOTE:

Before adjusting the rear brake, the rear brake linings should be inspected.

### CAUTION:

Proper lever and pedal free play is essential to avoid excessive brake drag.

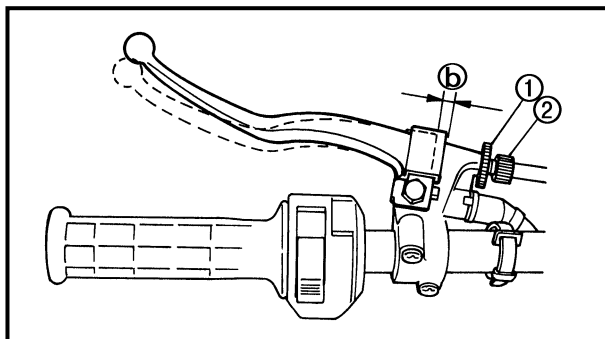
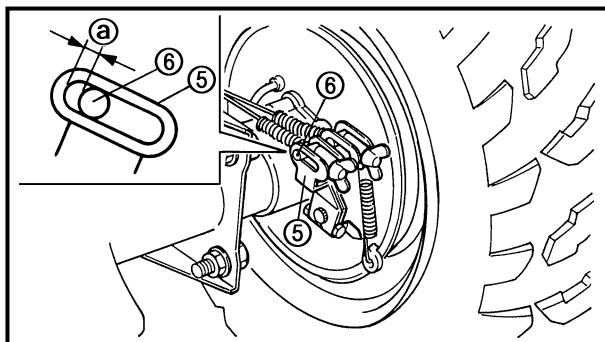
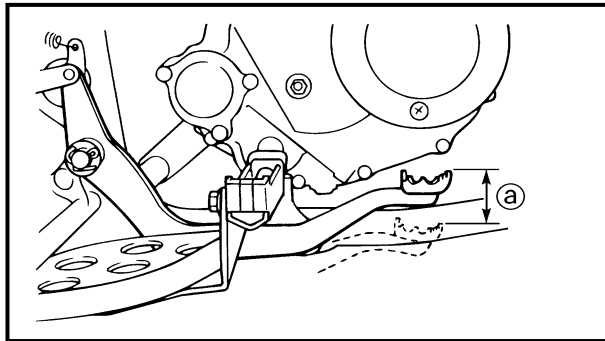
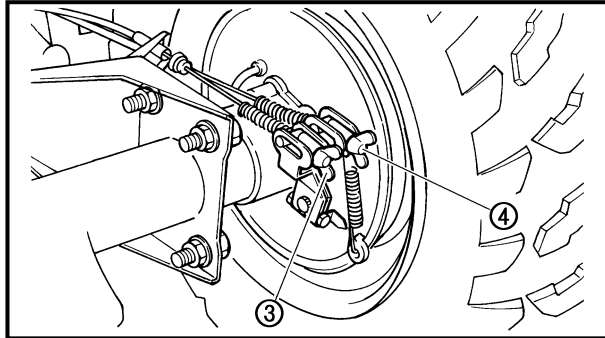
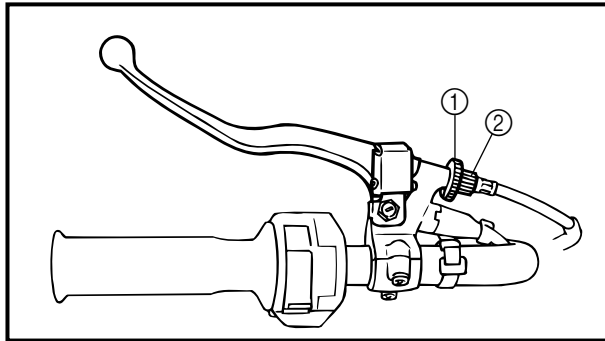
### ⚠ WARNING

Always adjust both the brake pedal and the brake lever whenever adjusting the rear brake.

- 1.Place the machine on a level place.

3

## REAR BRAKE LEVER AND PEDAL ADJUSTMENT



### 2.Adjust:

- Brake lever free play
- Brake pedal free play

\*\*\*\*\*

### Adjustment steps:

#### NOTE:

Before adjusting the free play, pump the brake pedal 2 to 3 times.

- Fully loosen the locknut ① (handlebar) and fully turn in the brake lever adjuster ②.
- Fully loosen brake lever cable adjuster ③ and brake pedal adjuster ④.
- Tighten the brake pedal adjuster ④ until proper free play is attained.



**Free play ③ (brake pedal):**  
20 ~ 30 mm (0.78 ~ 1.18 in)

- Turn the brake lever cable adjuster ③ clockwise until the gap ③ is within the specified limits.



**Gap ③:**  
0 ~ 1 mm (0 ~ 0.04 in)

- ⑤ Brake cam lever
- ⑥ Pin

- Turn out the brake lever cable adjuster ② (handlebar) until proper free play is attained.



**Free play ⑤ (brake lever):**  
5 ~ 7 mm (0.20 ~ 0.28 in)

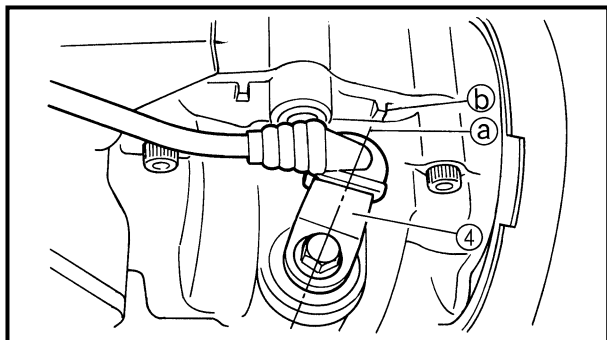
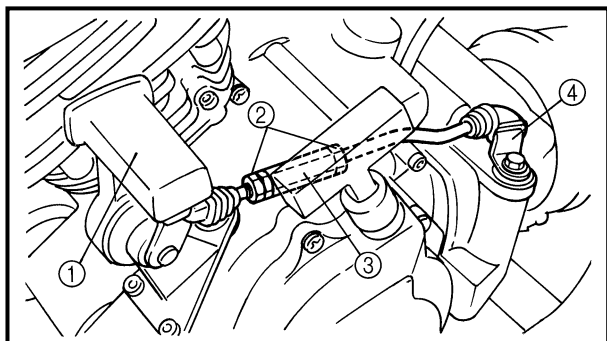
- Tighten the locknut ① (handlebar).
- Inspect brake lever and brake pedal free play.  
If out of specification, perform adjustment steps again.

### ⚠ WARNING

After this adjustment is performed, block the rear of the machine off the ground, and spin the rear wheels to ensure there is no brake drag. If any brake drag is noticed, perform the above steps again.

\*\*\*\*\*

## DRIVE SELECT LEVER POSITION ADJUSTMENT/ FINAL DRIVE GEAR OIL LEVEL INSPECTION



### DRIVE SELECT LEVER POSITION ADJUSTMENT

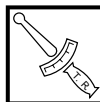
#### 1.Adjust:

- Drive select lever position

\*\*\*\*\*

#### Adjustment steps:

- Place the machine on a level place.
- Shift the transmission in first gear, and move the select lever ① to reverse position.
- Loosen the locknuts ②.
- Turn the select lever adjuster ③ in or out until lever ④ center line ① aligns with match mark b on the crankcase cover.
- Tighten the locknuts ②.



**Locknut (select lever adjuster):**  
**15 Nm (1.5 m • kg, 11 ft • lb)**

#### NOTE:

After adjusting the drive select lever, be sure the reverse indicator light comes on when the drive select lever is in reverse position.

\*\*\*\*\*

### FINAL DRIVE GEAR OIL LEVEL INSPECTION

#### 1.Inspect:

- Final drive gear oil level  
Oil level low → Add sufficient oil.

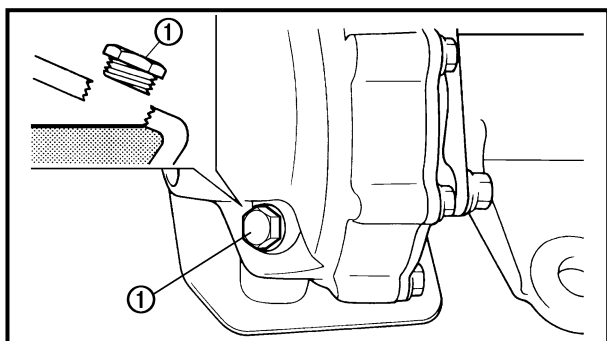
#### NOTE:

The engine should be cool (at atmospheric temperature).

\*\*\*\*\*

#### Inspection steps:

- Place the machine on a level place.
- Place an oil pan under the final drive gear case.
- Remove the filler bolt ① and copper washer.
- Visually check the oil level. Correct oil level should be at the lower brim of the hole.



- If the oil level is low, add the recommended oil up to the specified level. Refer to "FINAL DRIVE GEAR OIL REPLACEMENT" section.
- Inspect the copper washer for damage. If damaged, replace it
- Install the copper washer and filler bolt.

## NOTE:

- Before installing the filler bolt, do not forget to fit the copper washer.
- After installing the filler bolt, inspect the oil leaks.



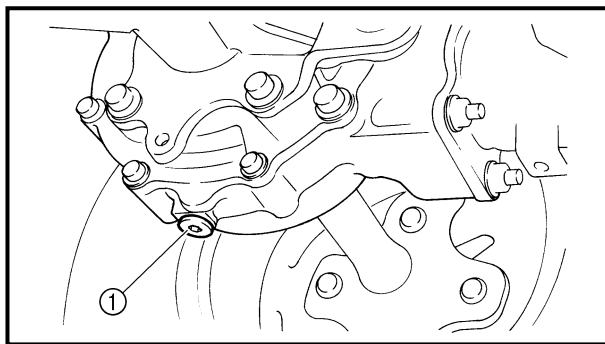
**Filler bolt (final drive gear case):**  
**23 Nm (2.3 m • kg, 17 ft • lb)**

\*\*\*\*\*

3

## FINAL DRIVE GEAR OIL REPLACEMENT

1. Place the machine on a level place.
2. Place an oil pan under the final drive gear case.



## 3. Remove:

- Final gear case protector
- Filler bolt (final drive gear case)
- Drain plug ① (gear case)  
Drain the final drive gear oil.

## 4. Inspect:

- Copper washer (filler bolt)
- Copper washer (drain plug)  
Damage → Replace.

## 5. Install:

- Drain plug (final drive gear case)



**Drain plug (final drive gear case):**  
**23 Nm (2.3 m • kg, 17 ft • lb)**

## 6. Fill:

- Final drive gear case

## CAUTION:

**Do not allow foreign material to enter the final drive gear case.**





**Recommended oil:**  
SAE 80 API "GL-4" hypoid gear oil

If desired, and SAE 80W90 hypoid gear oil may be used for all condition.

**Periodic oil change:**

0.25 L (0.21 Imp qt, 0.27 US qt)

**Total amount:**

0.27 L (0.24 Imp qt, 0.29 US qt)

7.Install:

- Filler bolt (final drive gear case)

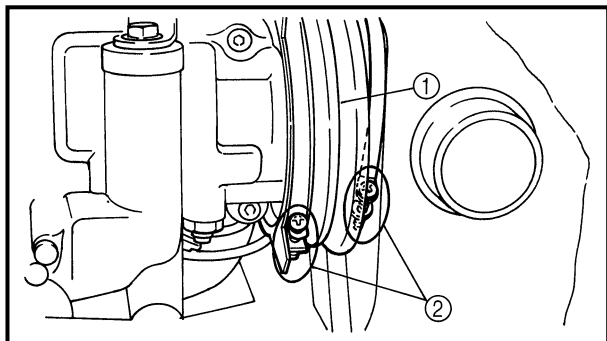
**NOTE:**

After filling the oil, inspect the oil leaks.



**Filler bolt (final drive gear case):**  
23 Nm (2.3 m • kg, 17 ft • lb)

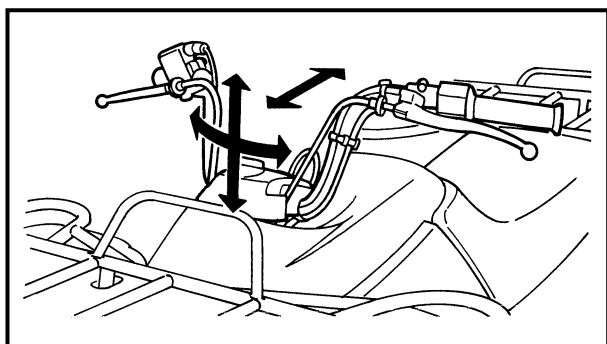
**3**



## **DRIVE SHAFT DUST BOOT INSPECTION**

1.Inspect:

- Dust boot ①  
Wear/Damage → Replace.  
Loose clamp ② → Tighten.  
Refer to the "REAR SHOCK ABSORBER AND SWINGARM" section in CHAPTER 7.



## **STEERING SYSTEM INSPECTION**

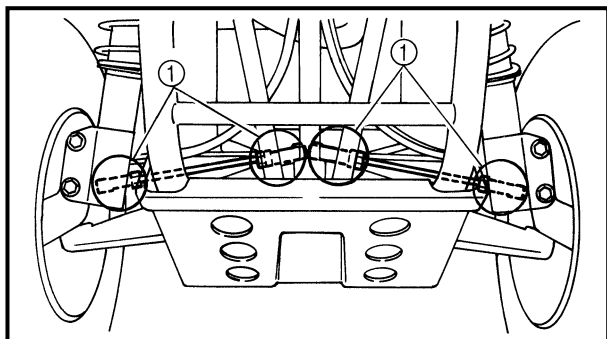
1.Place the machine on a level place.

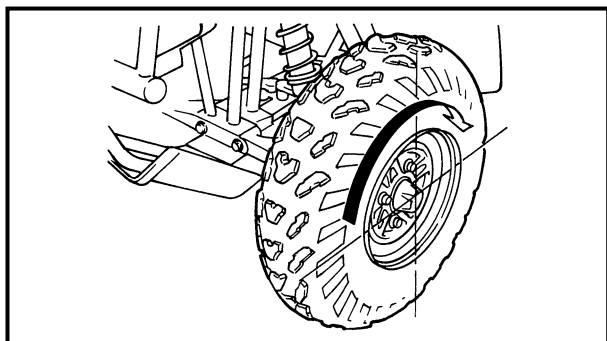
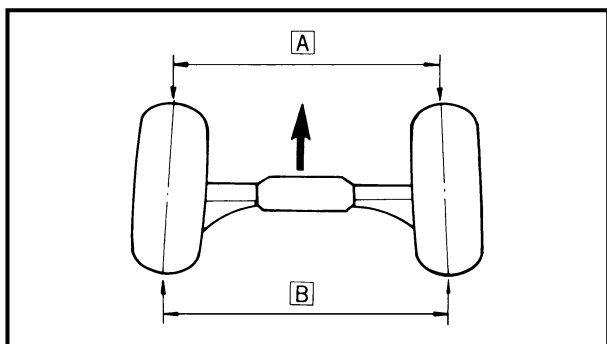
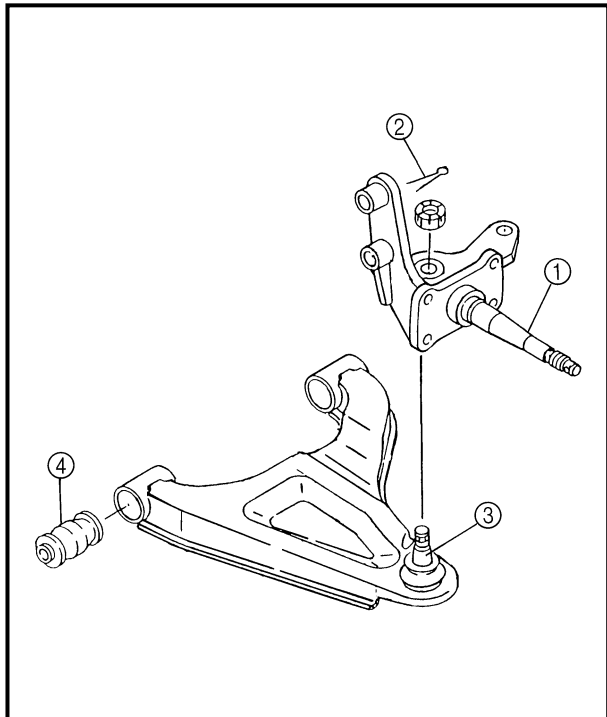
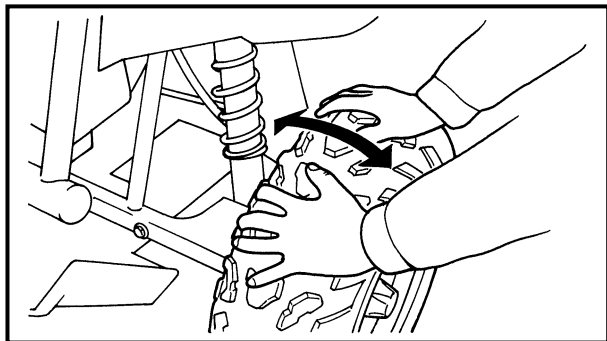
2.Check:

- Steering shaft bushings and bearings  
Move the handlebar up and down, and/or back and forth.  
Excessive play → Replace the steering shaft bushings and or bearings.  
Refer to "STEERING SYSTEM" section in the CHAPTER 7.

3.Check:

- Tie-rod ends  
Turn the handlebar to the left and/or right until it stops completely, then slightly move the handlebar from left to right.  
Tie-rod end ① has any vertical play → Replace the tie-rod end(s).  
Refer to the "STEERING SYSTEM" section in CHAPTER 7.





4. Raise the front end of the machine so that there is no weight on the front wheels.

5. Check:

- Knuckles and/or wheel bearings  
Move the wheels laterally back and forth.  
Excessive free play → Replace the following parts.

- 1) Wheel bearings
- 2) Knuckle shaft(s) ①
- 3) Cotter pin(s) ②
- 4) Stud bolt(s) ③ (lower arm)
- 5) Bushings ④ (lower arm)

Refer to the "STEERING SYSTEM" section in CHAPTER 7.

## TOE-IN ADJUSTMENT

1. Place the machine on a level place.

2. Measure:

- Toe-in  
Out of specification → Adjust.

\*\*\*\*\*

### Toe-in measurement steps:

- Mark both front tire tread centers.
- Raise the front end of the machine so that there is no weight on the front tires.
- Fix the handlebar straight ahead.
- Measure the width **A** Between the marks.
- Rotate the front tires 180 degrees until the mark come exactly opposite.
- Measure the width **B** between the marks.
- Calculate the toe-in using the formula given below.

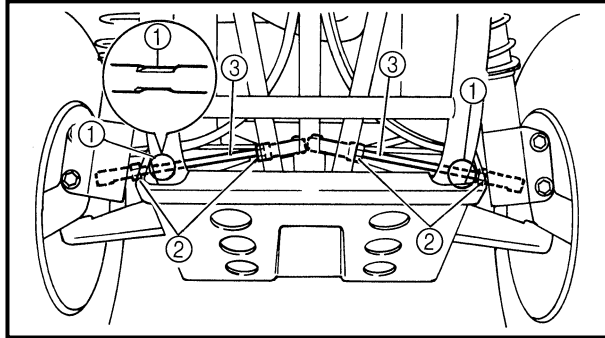
$$\text{Toe-in} = \mathbf{B} - \mathbf{A}:$$



**Toe-in:**  
0 ~ 5 mm (0 ~ 0.2 in)

- If the toe-in is incorrect, adjust the toe-in.

\*\*\*\*\*



## 3.Adjust:

- Toe-in

\*\*\*\*\*

### Adjustment steps:

- Place a confirmation marks ① on the both tie-rods end.
- Loosen the rod end locknuts ② of both tie-rods.
- The same number of turns should be given to both tie-rods ③ right and left until the specified toe-in is obtained, so that the lengths of the rods will be kept the same.
- Tighten the rod end locknuts ② of both tie-rods.

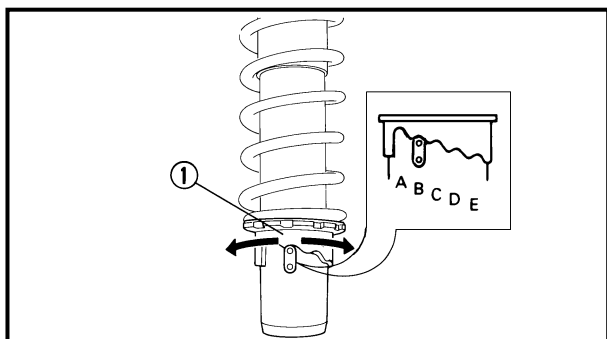
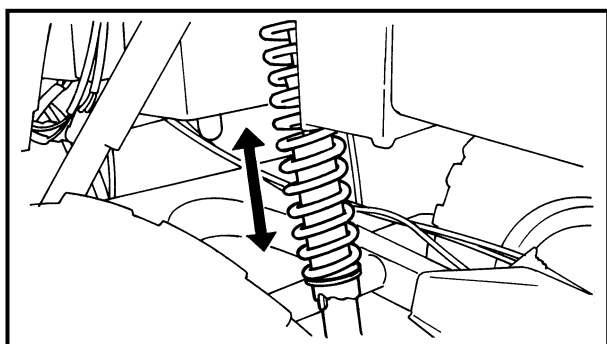
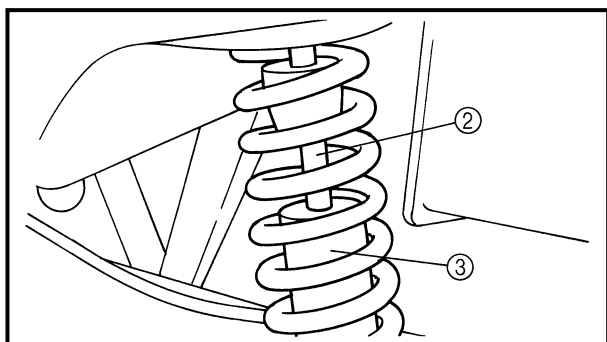
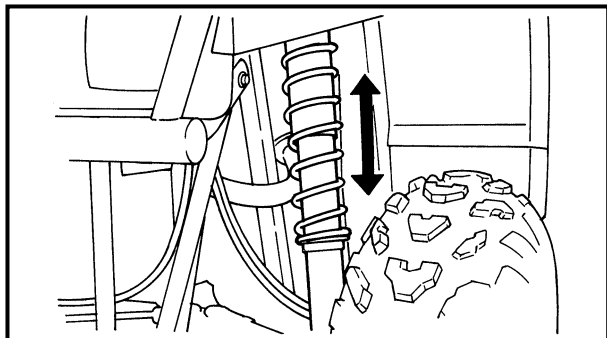
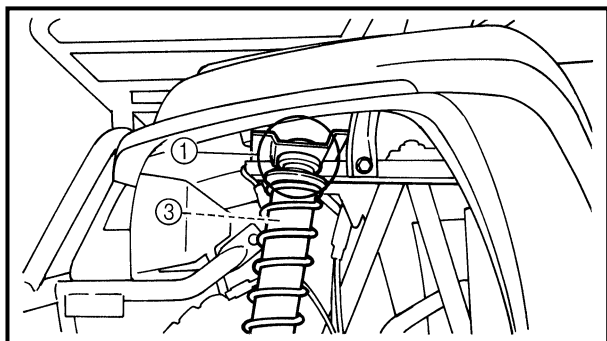


**Locknut (rod end):**  
30 Nm (3.0 m • kg, 22 ft • lb)

## ⚠ WARNING

- Be sure that both tie-rods (left and right) are turned by the same amount. If not, the machine will go right or left even though the handlebar is positioned straight and it may lead to mishandling and accident.
- After setting the toe-in to specification, run the machine slowly for some distance with the hands lightly on the handlebar and check that the handlebar responds correctly. If not, turn either the right or left tie-rod within the toe-in specification.

\*\*\*\*\*



## FRONT AND REAR SHOCK ABSORBERS INSPECTION

1. Place the machine on a level place.

2. Check:

- Ball joint complete ① (front)  
Cracks/Damage → Replace as a set.
- Damper rod ② (rear)  
Scratch/Damage → Replace as a set.
- Oil leakage ③

Excessive oil leakage → Replace as a set.

Refer to the "FRONT SHOCK ABSORBER AND LOWER ARM" section or "REAR SHOCK ABSORBER AND SWINGARM" section in CHAPTER 7.

3. Check:

- Operation  
Pump the shock absorbers up and down for several times.  
Unsmooth operation → Replace as a set.  
Refer to the "FRONT SHOCK ABSORBER AND LOWER ARM" section or "REAR SHOCK ABSORBER AND SWINGARM" section in CHAPTER 7.

**A** Front shock absorber

**B** Rear shock absorber

## REAR SHOCK ABSORBER ADJUSTMENT

1. Adjust:

- Spring preload  
Turn the adjuster ① to increase or decrease the spring preload.

### NOTE:

The spring preload of the rear shock absorber can be adjusted to suit rider's preference, weight, and the course conditions.

**Standard position: B**

**A—Softest**

**E—Stiffest**

## TIRE INSPECTION

**⚠ WARNING**

This model is equipped with low pressure tires. It is important that they be inflated correctly and maintained at the proper pressures.

- **TIRE CHARACTERISTICS**

- 1) Tire characteristics influence the handling of ATV's. The tires listed below have been approved by Yamaha Motor Co., Ltd. for this model. If other tire combinations are used, they can adversely affect your machine's handling characteristics and are therefore not recommended.

	Manufacturer	Size	Type
Front	CARLISLE	AT22 × 7-10	TRAIL WOLF
Front	DUNLOP	AT22 × 7-10	KT701
Rear	CARLISLE	AT22 × 10-10	TRAIL WOLF
Rear	DUNLOP	AT22 × 10-10	KT705

- **TIRE PRESSURE**

- 1) Recommend tire pressure

Front 20 kPa (0.20 kgf/cm<sup>2</sup>, 2.8 psi)

Rear 25 kPa (0.25 kgf/cm<sup>2</sup>, 3.6 psi)

- 2) Tire pressure below the minimum specified could cause the tire to dislodge from the rim under severe riding conditions.

The following are minimums:

Front 17 kPa (0.17 kgf/cm<sup>2</sup>, 2.4 psi)

Rear 22 kPa (0.22 kgf/cm<sup>2</sup>, 3.1 psi)

- 3) Use no more than

Front 250 kPa (2.5 kgf/cm<sup>2</sup>, 36 psi)

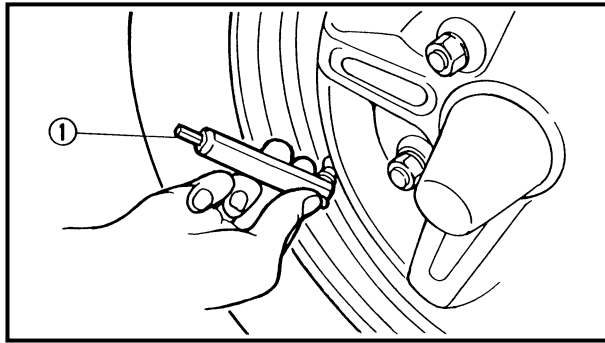
Rear 250 kPa (2.5 kgf/cm<sup>2</sup>, 36 psi)

When seating the tire beads. Higher pressures may cause the tire to burst. Inflate the tires very slowly and carefully. Fast inflation could cause the tire to burst.

- **MAXIMUM LOADING LIMIT**

- 1) Vehicle load limits: 165 kg (364 lb)\*

\*Total weight of cargo, rider, and accessories.



## 1.Measure:

- Tire pressure (cold tire pressure)  
Out of specification → Adjust.

**NOTE:**

- The Low-pressure tire gauge ① is included in the standard equipment.
- If dust or the like is stuck to this gauge, it does not provide correct readings. Therefore, make two measurements on the tire pressure and get the second reading.

**⚠ WARNING**

Uneven or improper tire pressure may adversely affect the handling of this machine and may cause loss of control.

- Maintain proper tire pressures.
- Set tire pressures when the tires are cold.
- Tire pressures must be equal in both front tires and equal in both rear tires.

Cold tire pressure	Front	rear
Standard	20 kPa (0.20 kgf/cm <sup>2</sup> , 2.9 psi)	25 kPa (0.25 kgf/cm <sup>2</sup> , 3.6 psi)
Minimum	17 kPa (0.17 kgf/cm <sup>2</sup> , 2.5 psi)	22 kPa (0.22 kgf/cm <sup>2</sup> , 3.2 psi)
Maximum	23 kPa (0.23 kgf/cm <sup>2</sup> , 3.3 psi)	28 kPa (0.28 kgf/cm <sup>2</sup> , 4.0 psi)

## 2.Inspect:

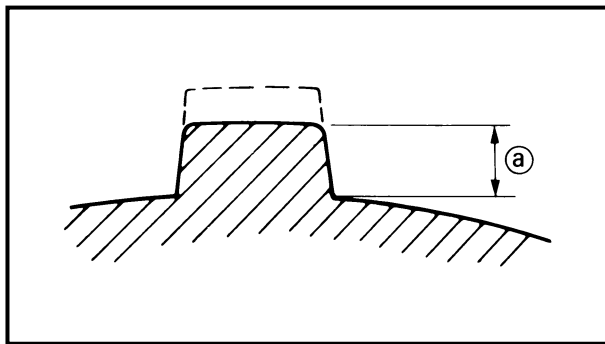
- Tire surfaces  
Wear/Damage → Replace.

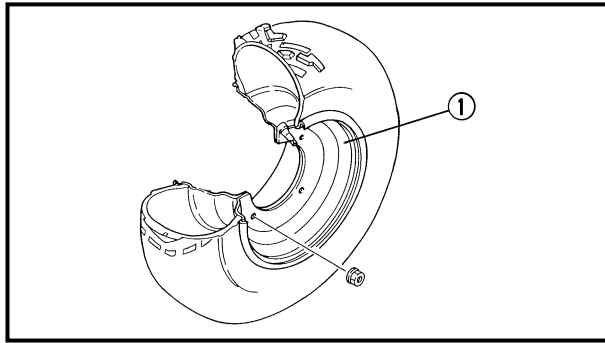
**⚠ WARNING**

It is dangerous to ride with a wornout tire. When a tire wear is out of specification, replace the tire immediately.



**Tire wear limit ②:**  
front and rear: 2.0 mm (0.08 in)





### WHEEL INSPECTION

1. Inspect:

- Wheels ①  
Cracks/Bends/Damage → Replace.

**NOTE:** \_\_\_\_\_  
Always balance the wheel when a tire or wheel has been changed or replaced.  
\_\_\_\_\_

**⚠ WARNING** \_\_\_\_\_  
Never attempt even small repairs to the wheel.  
\_\_\_\_\_

**ELECTRICAL****BATTERY INSPECTION****⚠ WARNING**

Battery electrolyte is dangerous; it contains sulfuric acid and therefore is poisonous and highly caustic.

Always follow these preventive measures:

- Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.
- Wear protective eye gear when handling or working near batteries.

Antidote (EXTERNAL):

- SKIN-Flush with water.
- EYES-Flush with water for 15 minutes and get immediate medical attention.

Antidote (INTERNAL):

- Drink large quantities of water or milk followed with milk of magnesia, beaten egg, or vegetable oil. Get immediate medical attention.

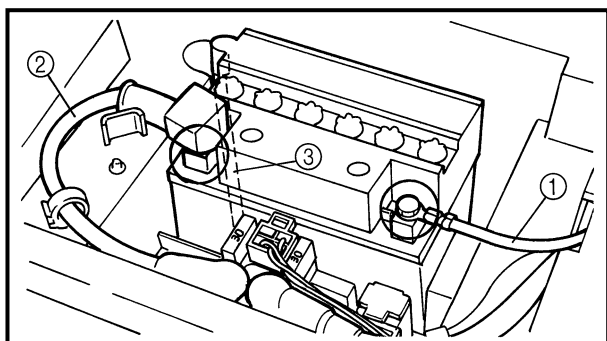
Batteries also generate explosive hydrogen gas. You should always follow these preventive measures:

- Charge batteries in a well-ventilated area.
- Keep batteries away from fire, sparks, or open flames (e.g., welding equipment, lighted cigarettes, etc.)
- **DO NOT SMOKE** When charging or handling batteries.

**KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.**

1.Remove:

- Seat  
Refer to the "REAR FENDER" section.



2.Disconnect:

- Battery leads (positive and negative)

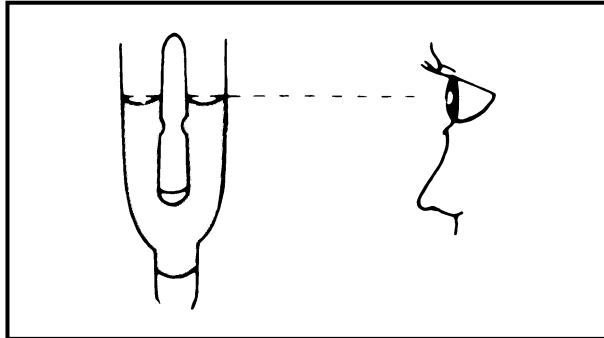
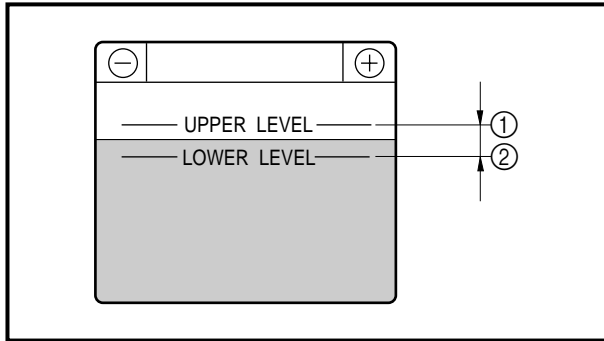
**⚠ WARNING**

**Disconnect the negative lead ① first.**

3.Remove:

- Battery bracket
- Battery ②
- Battery breather hose ③





## 4. Inspect:

- Battery fluid level  
Battery fluid level low → Fill.  
Fluid level should be between upper level ① and lower level ② marks.

### CAUTION:

**Refill with distilled water only; tap water contains minerals harmful to a battery.**

## 5. Inspect:

- Battery fluid specific gravity  
Out of specification → Charge.

**Charging current: 1.2 amps/10 hrs  
Specific gravity: 1.280 at 20°C (68°F)**

\*\*\*\*\*

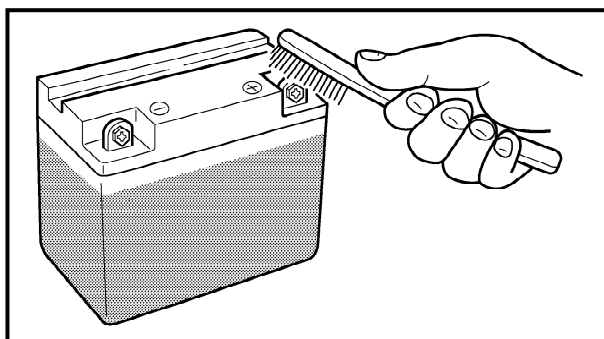
## Replace the battery if:

- Battery voltage will not rise to a specific value or bubbles fail to rise even after many hours of charging.
- Sulfation of one or more cells occurs, as indicated by the plates turning white, or an accumulation of material exists in the bottom of the cell.
- Specific gravity readings after a long, slow charge indicate one cell to be lower than the rest.
- Warpage or buckling of plates or insulators is evident.

\*\*\*\*\*

### CAUTION:

**Always charge a new battery before using it to ensure maximum performance.**



## 6. Inspect:

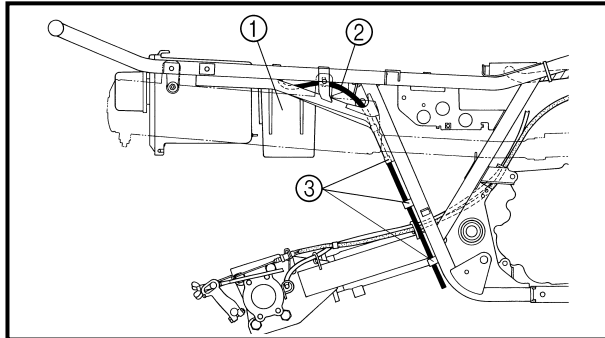
- Battery terminal  
Dirty terminal → Clean with wire brush.  
Poor connection → Correct.

### NOTE:

After cleaning the terminals, apply grease lightly to the terminals.

## 7. Inspect:

- Battery breather hose  
Obstruction → Remove.  
Damage → Replace.



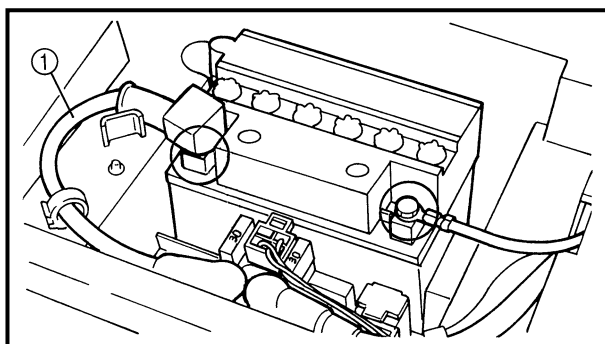
## 8. Install:

- Battery ①
- Battery breather hose ②  
Refer to the “CABLE ROUTING” section in CHAPTER 2.

### CAUTION:

When installing the battery, be sure the breather hose is routed correctly. If the breather hose touches the frame or exits in such a way as to cause battery electrolyte or gas to exit onto the frame, structural and cosmetic damage to the machine can occur.

- ③ Battery breather hose guide



## 9. Connect:

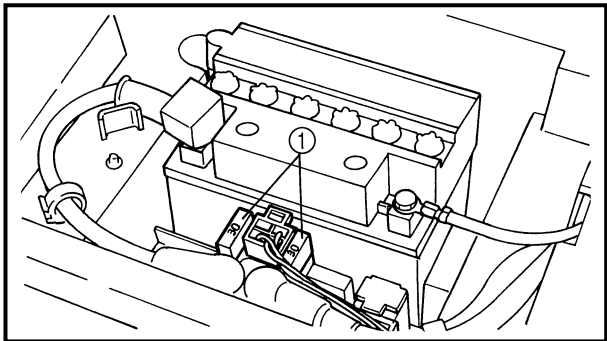
- Battery leads (positive and negative)

### ⚠ WARNING

Connect the positive lead ① first.

## 10. Install:

- Battery bracket
- Seat  
Refer to the “REAR FENDER” section.



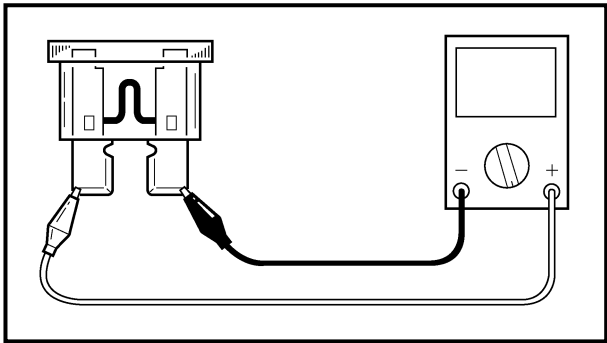
FUSE INSPECTION

**CAUTION:** \_\_\_\_\_  
Don't forget to turn off the main switch when checking or replacing the fuse. Otherwise, it may cause accidental shortcircuiting.

**⚠ WARNING** \_\_\_\_\_  
Do not use fuses of a higher amperage rating than those recommended. Substitution of a fuse of improper rating can cause extensive electrical system damage and possible fire.

Description	Amperage	Quantity
Main	30A	1
Spare	30A	1

- 1.Remove:
- Seat  
Refer to the "REAR FENDER-Removal" section.
- 2.Remove:
- Fuse cover ①
  - Fuse



- 3.Inspect:
- Fuse
- \*\*\*\*\*
- Inspection steps:**
- Connect the Pocket Tester to the fuse and check it for continuity.
- NOTE:** \_\_\_\_\_  
Set the tester selector to " $\Omega \times 1$ " position.



**Pocket tester:**  
P/N. YU-03112, 90890-03112

- If the tester is indicated at  $\infty$ . The fuse is blown, replace it.
- \*\*\*\*\*

3

4.Replace:

- Blown fuse

\*\*\*\*\*

## Blown fuse replacement steps:

- Turn off ignition and the circuit.
- Install a new fuse of proper amperage.
- Turn on the switches and see if the electrical device operates.
- Fuse interrupts the circuit again' Check electrical system.

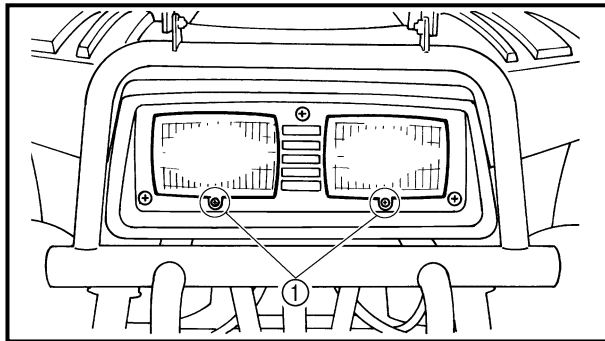
Refer to "CHAPTER 8. ELECTRICAL" for further information.

\*\*\*\*\*

5.Install:

- Fuse cover
- Seat

Refer to the "REAR FENDER-Installation" section.

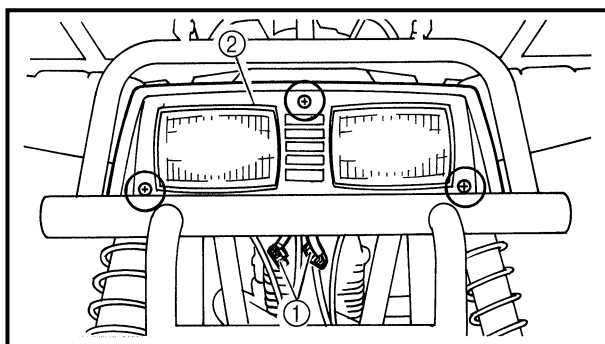


## HEADLIGHT BEAM ADJUSTMENT

1.Adjust:

- Headlight beam (vertically)

Vertical adjustment	
Higher	Turn the adjusting screw ① clockwise.
Lower	Turn the adjusting screw ① counterclockwise.



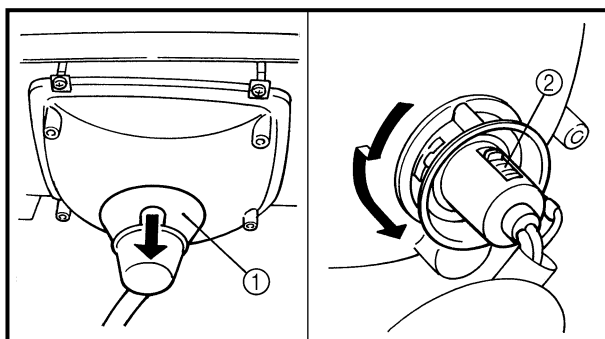
## HEADLIGHT BULB REPLACEMENT

1.Disconnect:

- Headlight lead couplers ①

2.Remove:

- Headlight unit ②



3.Pull back the bulb cover ①.

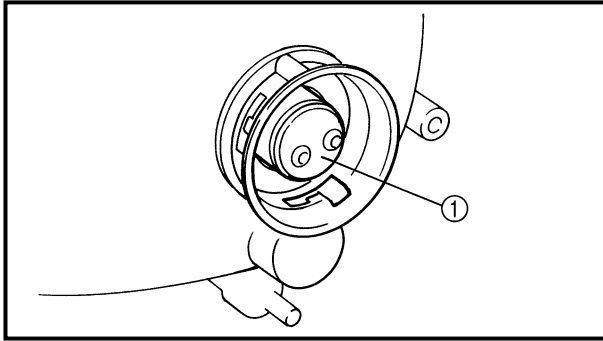
4.Remove:

- Bulb holder ②

While pushing the bulb holder ②, turn it counterclockwise.

## NOTE:

Hold the head light on the front side while removing the bulb socket.

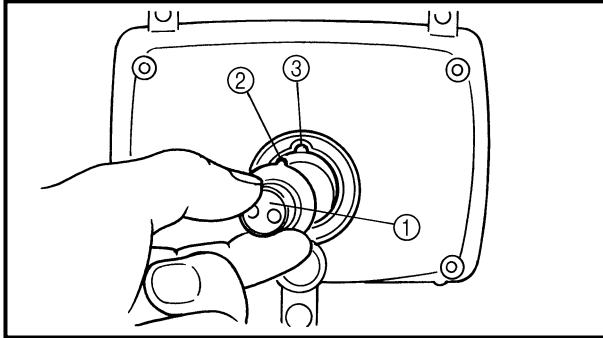


5.Remove:

- Bulb ①

## ⚠ WARNING

Keep flammable products or your hands away from the bulb while it is on, it will be hot. Do not touch the bulb until it cools down.



6.Install:

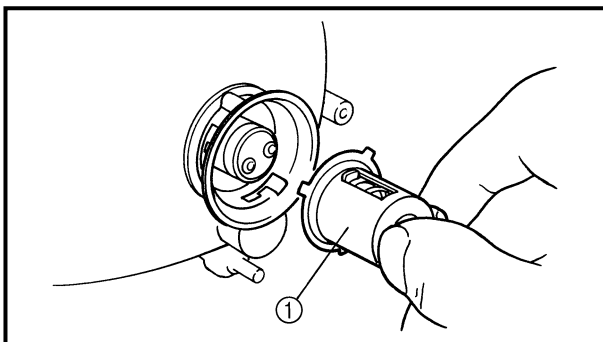
- Bulb ① (new)

## NOTE:

Make sure the projection ② on the bulb is meshed with the slot ③ on the light case.

## CAUTION:

Avoid touching glass part of bulb. Also keep it free from oil otherwise, transparency of glass, bulb life and illuminous flux will be adversely affected. If oil gets on bulb, clean it with a cloth moistened thoroughly with alcohol or lacquer thinner.



7.Connect:

- Bulb holder ①

## NOTE:

Make sure the projections on the bulb holder are meshed with the slots on the light case.

8.Set the bulb cover to the bulb holder.

9.Install:

- Headlight unit

## NOTE:

Securely install the rubber grommet of the head light lead to the head light cover.

10.Connect:

- Headlight lead couplers

11.Adjust:

- Headlight beam

Refer to "HEADLIGHT BEAM ADJUSTMENT" section.





## ENGINE OVERHAUL

### ENGINE REMOVAL

**NOTE:**

- It is not necessary to remove the engine in order to remove the following components:
  - \* Cylinder head
  - \* Cylinder
  - \* Piston
  - \* Primary and secondary clutches
  - \* Oil pump
  - \* Shift shaft
  - \* CDI Magneto
- It is necessary to remove the rear wheel drive assembly in order to remove the engine assembly.

**PREPARATION FOR REMOVAL**

1. Remove all dirt, mud, dust and foreign material before removal and disassembly.
2. Use proper tools and cleaning equipment. Refer to "GENERAL INFORMATION-SPECIAL TOOLS" section in the CHAPTER 1.

**NOTE:**

When disassembling the engine, keep mated parts together. This includes gears, cylinder, piston and other parts that have been "mated" through normal wear. Mated parts must be reused as an assembly or replaced.

3. During engine disassembly, clean all parts and place them in trays in the order of disassembly. This will speed up assembly time and help assure that all parts are correctly reinstalled in the engine.
4. Place the machine on a level place.

**FRONT FENDER AND REAR FENDER**

1. Remove:

- Seat
- Fuel tank
- Front carrier
- Front bumper
- Front fender
- Rear carrier
- Rear fender

Refer to the "FENDERS AND FUEL TANK-Removal" section in CHAPTER 3.

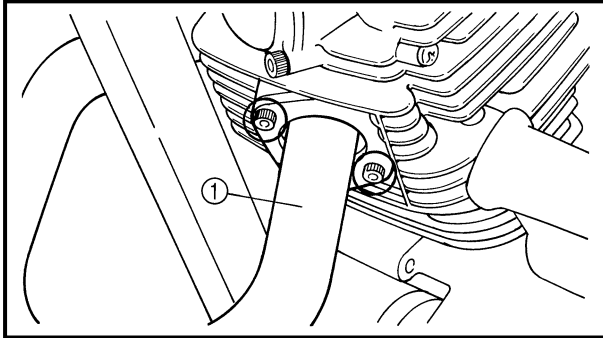


### ENGINE OIL

#### 1.Drain:

- Engine oil

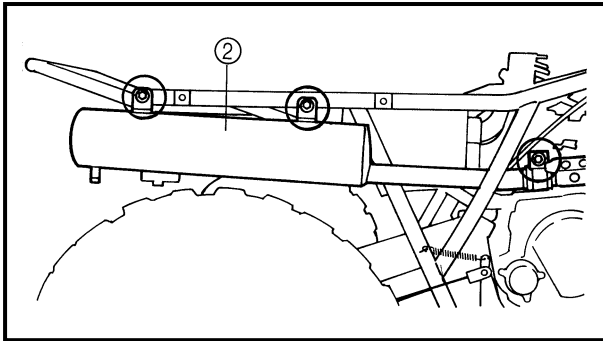
Refer to the "ENGINE OIL REPLACEMENT" section in CHAPTER 3.



### EXHAUST PIPE AND MUFFLER

#### 1.Remove:

- Exhaust pipe ①
- Muffler ②



### CARBURETOR

#### 1.Drain:

- Fuel (float chamber)

#### NOTE:

Place a rag under the over flow hose to absorb a spilt fuel.

#### ⚠ WARNING

**Gasoline is highly flammable. Avoid spilling fuel on the hot engine.**

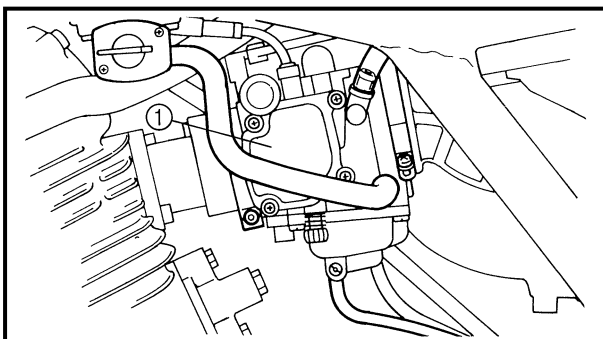
#### 2.Remove:

- Carburetor ①

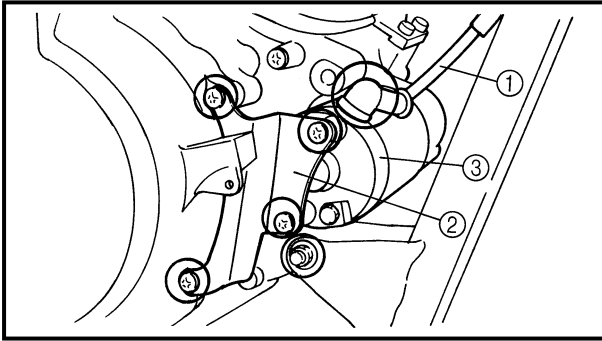
Refer to the "CARBURETOR" section in the CHAPTER 5.

#### NOTE:

Cover the carburetor with a clean rag to prevent dirt or foreign material from entering the carburetor.







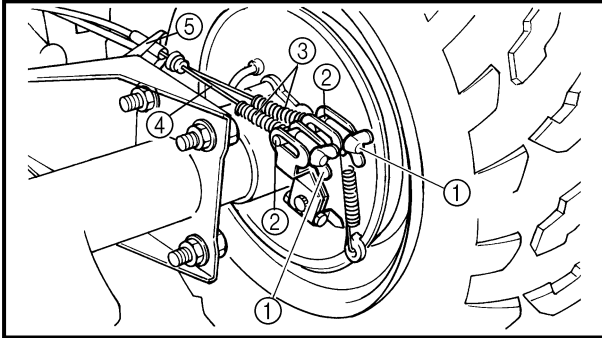
## STARTER MOTOR

1.Disconnect:

- Starter motor lead ①

2.Remove:

- Starter motor bracket ②
- Starter motor ③



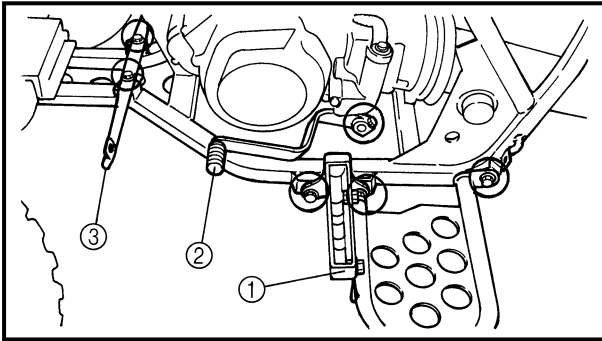
## REAR BRAKE CABLES AND FOOTREST

1.Remove:

- Adjusters ① (brake lever and brake pedal)
- Pins ②
- Springs ③

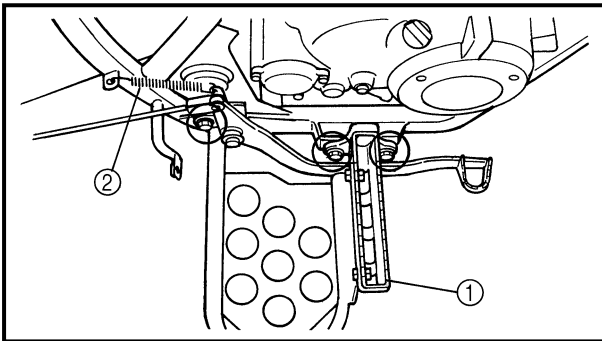
2.Disconnect:

- Brake cable ④ (from brake cable bracket ⑤).



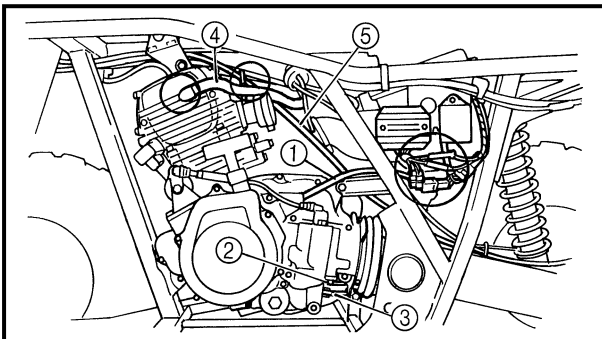
3.Remove:

- Footrest ① (left)
- Shift pedal ②
- Front fender stay ③



4.Disconnect:

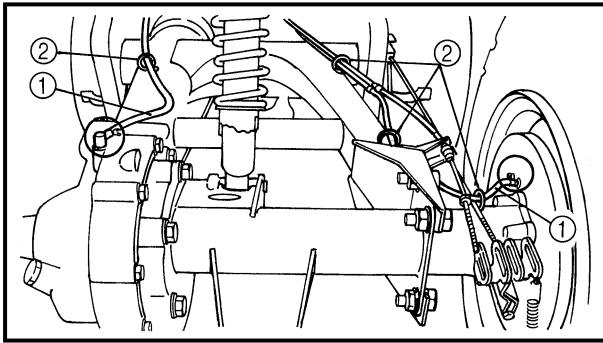
- Footrest ① (right)
- Spring ②



## WIRINGS AND HOSES

1.Disconnect:

- Spark plug cap
- CDI magneto leads ①
- "REVERSE" switch lead ②
- "NEUTRAL" switch lead ③
- Breather hose ④ (cam cover)
- Brake cable ⑤ (from cable guide)



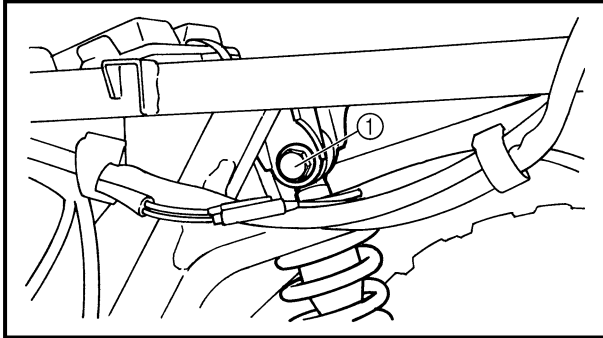
### REAR WHEEL DRIVE ASSEMBLY AND SWINGARM

#### 1. Disconnect:

- Breather hose ① (final gear housing and rear brake drum)  
(from the cable guides ② of main frame)
- 2. Block the front wheels, and elevate the rear wheels by placing the suitable stand under the frame.

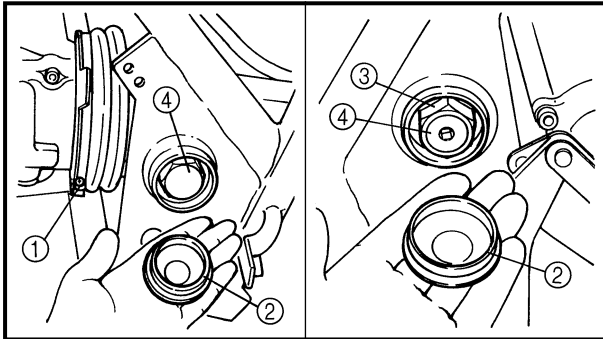
#### 3. Remove:

- Bolt ① (rear shock absorber-top)



#### 4. Remove:

- Clamps ① (rubber boot)
- Pivot shaft caps ②
- Locknuts ③ (pivot shaft)
- Pivot shafts ④ (swingarm)

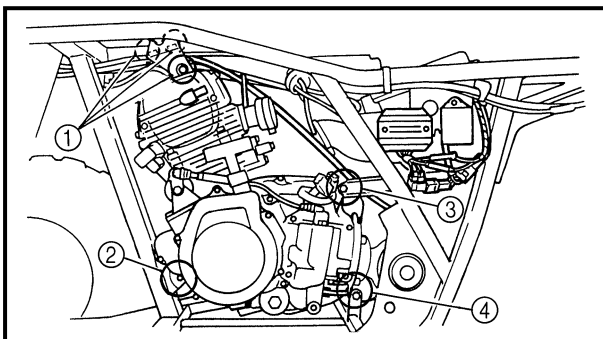
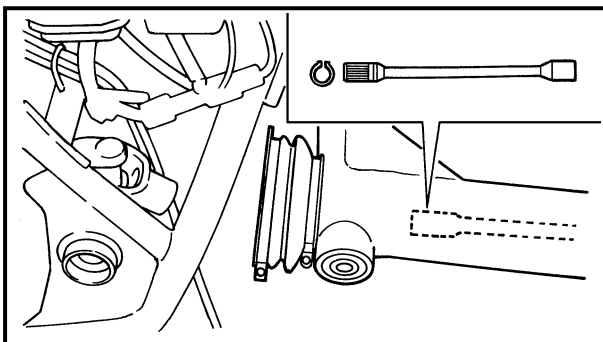


#### 5. Remove:

- Rear wheel drive assembly/swingarm

### CAUTION:

- When removing the swingarm, hold the shock absorber so that it may not fall over.
- When the swingarm is disconnected from the rubber boot, the drive shaft may fall off. Be careful not to lose these parts.



### ENGINE REMOVAL

#### 1. Remove:

- Bolts ① (engine mounting - top)
- Bolt ② (engine mounting - front)
- Bolt ③ (engine mounting - rear upper)
- Bolt ④ (engine mounting - rear lower)

#### 2. Remove:

- Engine assembly (to right side)

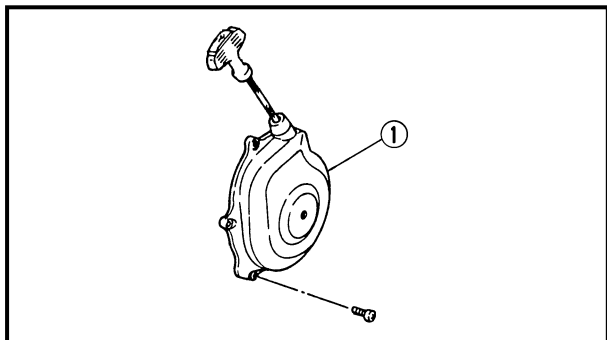
**ENGINE DISASSEMBLY****CYLINDER HEAD ASSEMBLY, CYLINDER AND PISTON****NOTE:**

With the engine mounted cylinder head assembly, cylinder and piston can be maintained by removing the following parts.

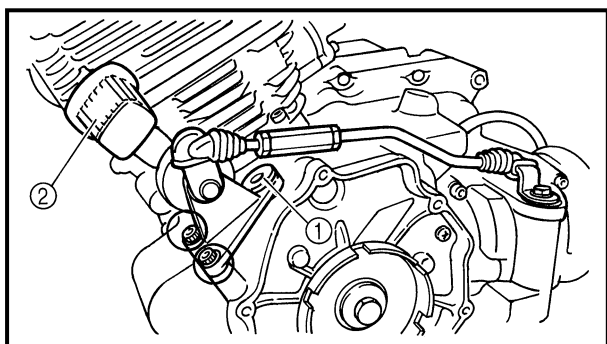
- Fuel tank
- Exhaust pipe
- Carburetor
- Engine stays (top)

**1.Remove:**

- Recoil starter assembly ①

**2.Remove:**

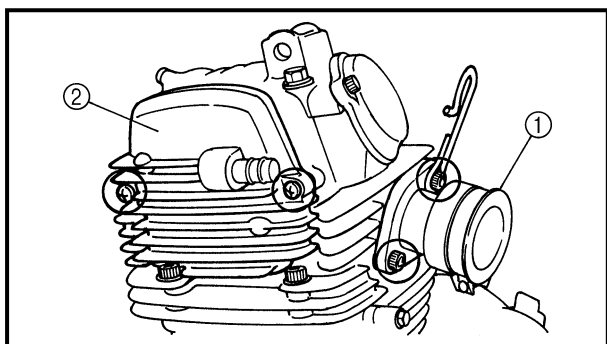
- Timing plug ①
- Drive select lever assembly ②
- Washers

**CAUTION:**

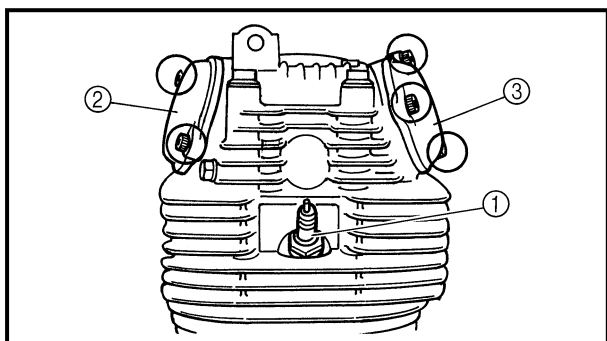
**Be careful not to lose washers.**

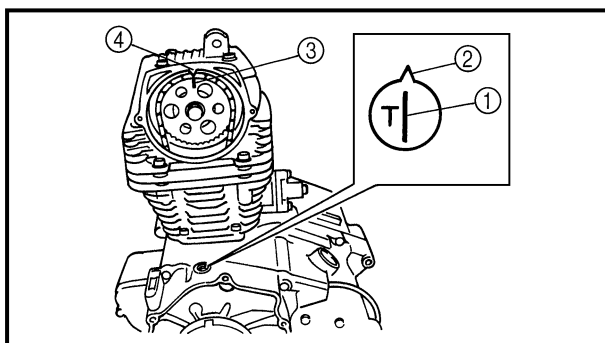
**3.Remove:**

- Carburetor joint ①
- Cam sprocket cover ②

**4.Remove:**

- Spark plug ①
- Tappet cover ② (intake)
- Tappet cover ③ (exhaust)



**5.Align:**

- "T" mark on the rotor

With the stationary pointer on the crankcase cover.

\*\*\*\*\*

**TDC alignment steps:**

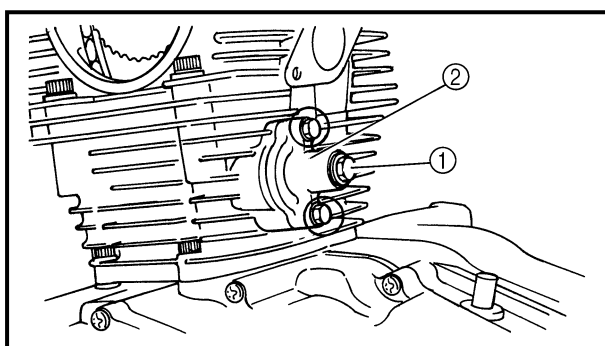
- Turn the crankshaft counterclockwise with wrench.
- Align the "T" mark ① on the rotor with the stationary pointer ② on the crankcase cover. When the "T" mark is aligned with the stationary pointer, the piston is at Top Dead Center (TDC).

**NOTE:**

TDC on compression stroke check:

- Both rocker arms must have a valve clearance when the cam sprocket match mark ③ is aligned with the cylinder head match mark ④.
- If not, give the crankshaft one counterclockwise turn to meet above condition.

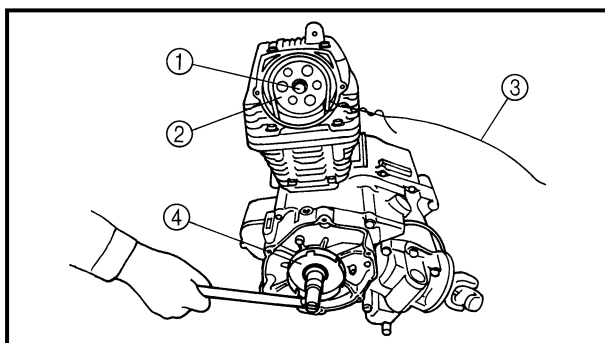
\*\*\*\*\*

**6.Loosen:**

- Cap bolt ① (chain tensioner)

**7.Remove:**

- Chain tensioner ②



8.Remove:

- Bolt ①
- Cam sprocket ②

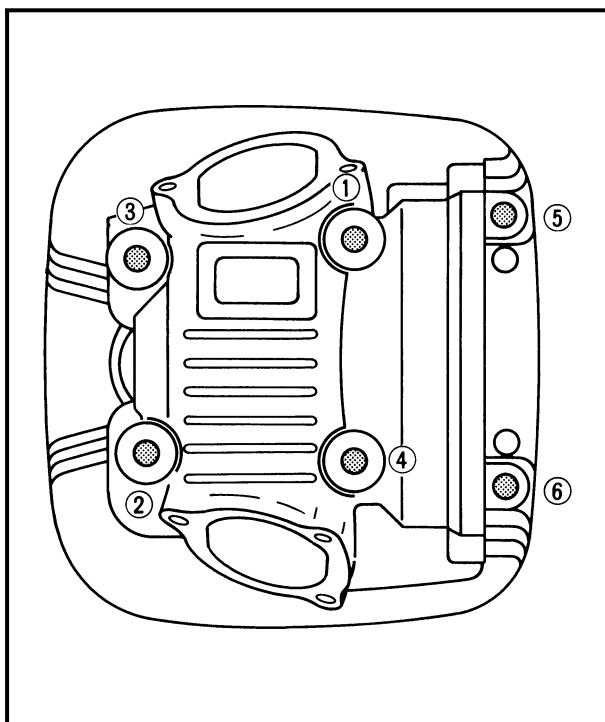
**NOTE:**

- Fasten a safety wire ③ to the timing chain to prevent it from falling into the crankcase.
- When removing the cam sprocket, it is not necessary to separate the timing chain.
- Hold the starter pulley ④ by the Rotor Holder to loosen the bolt on the cam sprocket.



**Rotor holder:**

**P/N. YU-01235, 90890-01235**

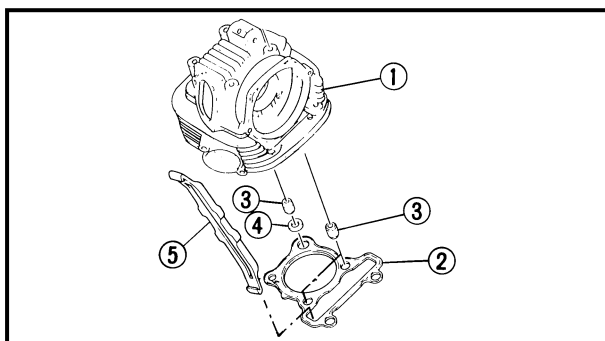


9.Remove:

- Bolts (cylinder head)

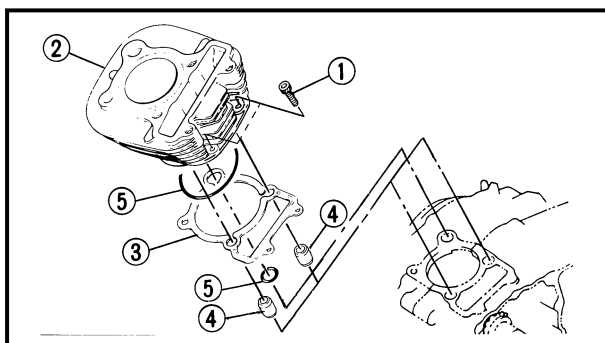
**NOTE:**

- Loosen the bolts 1/4 turn each and remove them after all are loosened.
- Loosen the bolts starting with the highest numbered one.
- The embossed numbers in the cylinder head designate the tightening sequence.



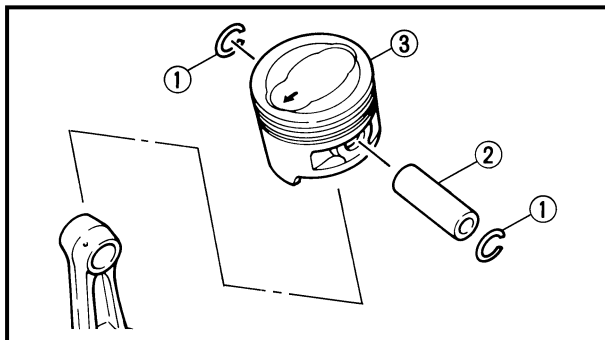
10.Remove:

- Cylinder head assembly ①
- Gasket ② (cylinder head)
- Dowel pins ③
- Oil seal ④
- Chain guide ⑤ (exhaust)



## 11.Remove:

- Bolts ① (cylinder)
- Cylinder ②
- Gasket ③ (cylinder)
- Dowel pins ④
- O-ring ⑤



## 12.Remove:

- Piston pin clip ①
- Piston pin ②
- Piston ③

**NOTE:**

- Before removing the piston pin clip, cover the crankcase with a clean rag so you will not accidentally drop the clip into the crankcase.
- Before removing the piston pin, deburr the clip groove and pin hole area. If the piston pin groove is deburred and piston pin is still difficult to remove, use Piston Pin Puller.

**Piston pin puller:**

P/N. YU-01304, 90890-01304

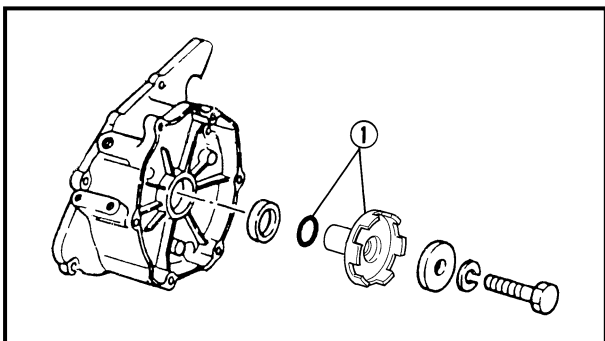
**CAUTION:**

**Do not use a hammer to drive the piston pin out.**

**STARTER PULLEY CDI MAGNETO****NOTE:**

With the engine mounted, the CDI magneto can be maintained by removing the following parts:

- Drive select lever assembly
- Recoil starter assembly
- Starter pulley



1.Remove:

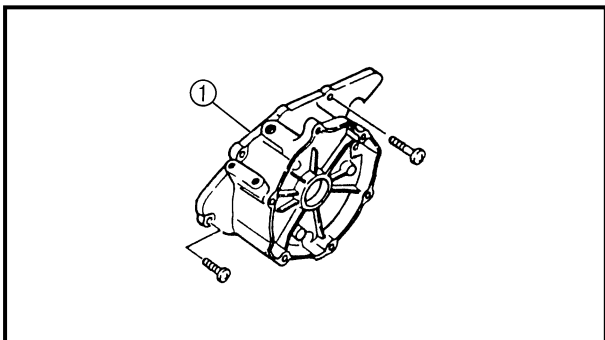
- Starter pulley ①

**NOTE:**

Hold the starter pulley by the Rotor Holder to loosen the bolt on the starter pulley.

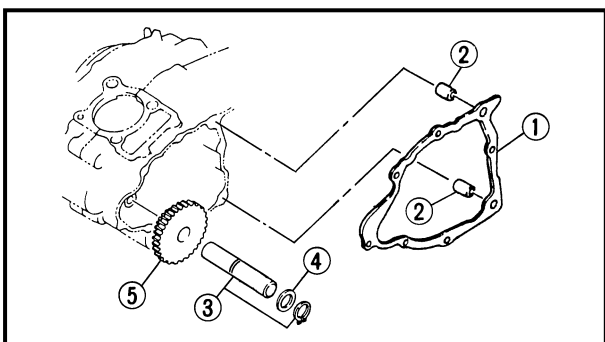


**Rotor holder:**  
P/N. YU-01235, 90890-01235



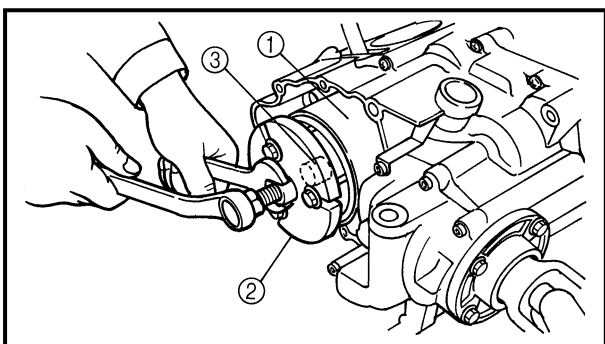
2.Remove:

- Crankcase cover ①



3.Remove:

- Gasket ①
- Dowel pins ②
- Shaft ③
- Washer ④
- Idle gear ⑤ (starter)



4.Remove:

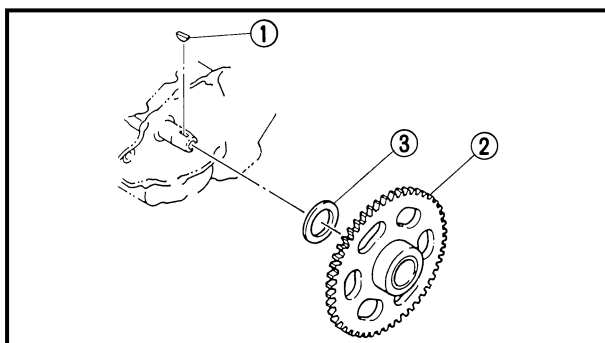
- CDI magneto ①

**NOTE:**

Use the Flywheel puller ② and Attachment ③.

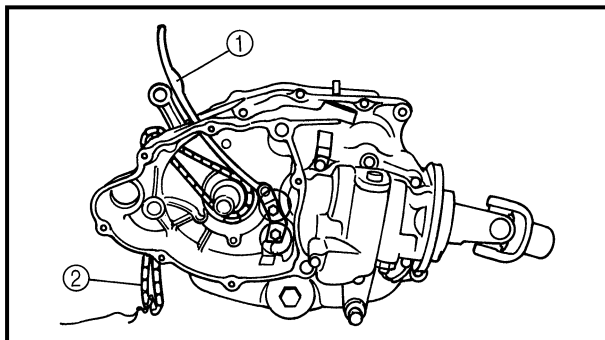


**Flywheel puller:**  
P/N. YU-33270, 90890-01362  
**Attachment:**  
P/N. YU-33278, 90890-04087



5.Remove:

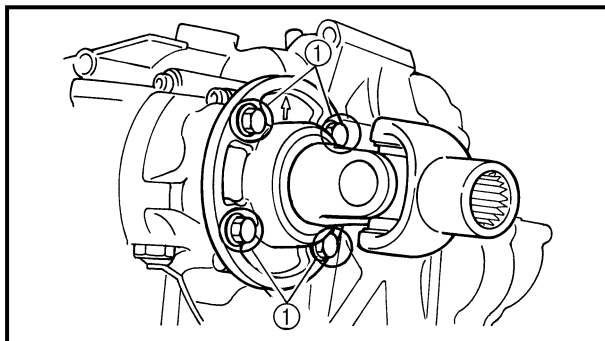
- Woodruff key ①
- Driven gear ② (starter)
- Washer ③



6.Remove:

- Chain guide ① (intake)
- Timing chain ②

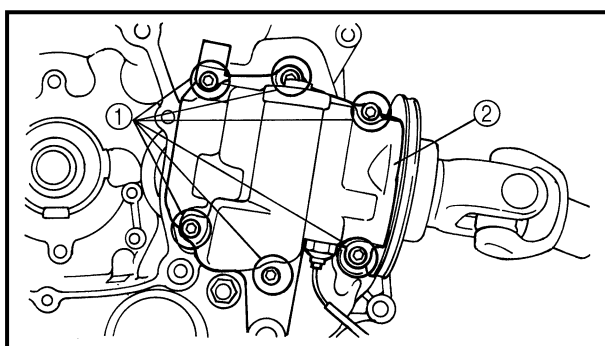
# 4



## MIDDLE DRIVEN PINION GEAR

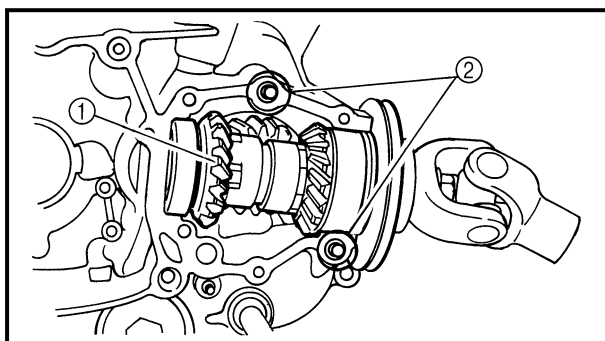
1.Remove:

- Bolts ① (bearing housing)



2.Remove:

- Bolts ① (middle gear case cover)
- Middle gear case cover ②



3.Remove:

- Middle driven pinion gear assembly ①
- Dowel pins ②



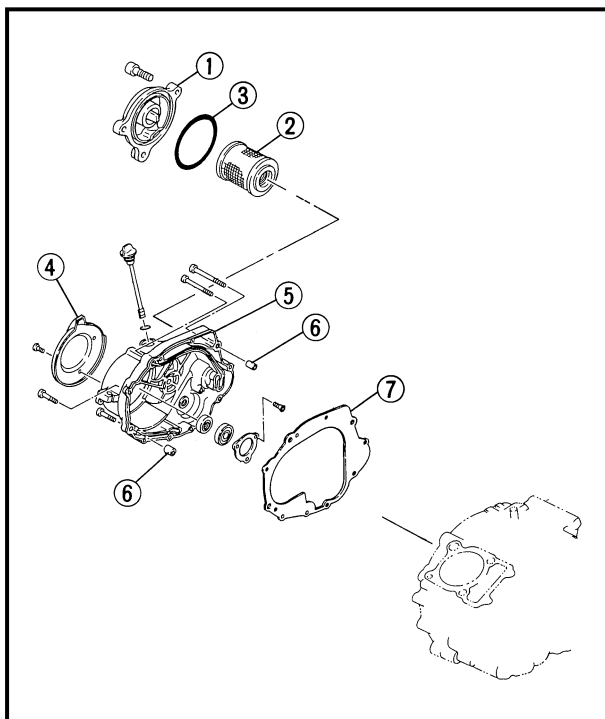


## PRIMARY AND SECONDARY CLUTCHES

**NOTE:**

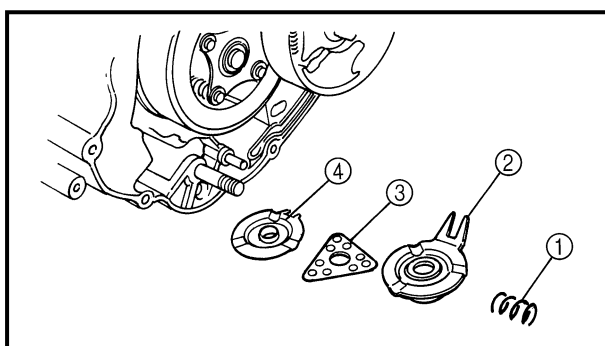
With the engine mounted, the primary and secondary clutches can be maintained by removing the following parts:

- Starter motor
- Crankcase cover (right)



## 1.Remove:

- Oil filter cover ①
- Oil filter ②
- O-ring ③
- Clutch cover protector ④
- Crankcase cover ⑤ (right)
- Dowel pins ⑥
- Gasket ⑦



## 2.Remove:

- Spring ① (clutch release lever)
- Shift guide #1 ②
- Ball holder ③
- Shift guide #2 ④

## 3.Straighten:

- Lock washer tab ①

## 4.Remove:

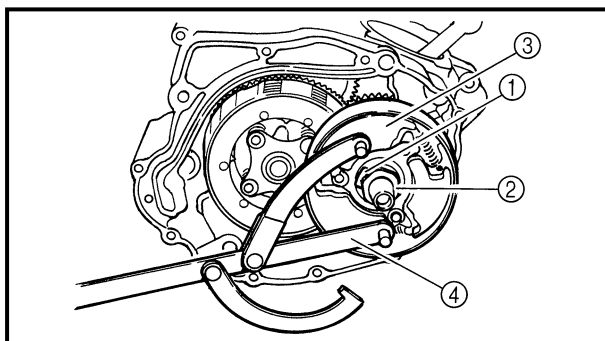
- Nut ② (primary clutch)

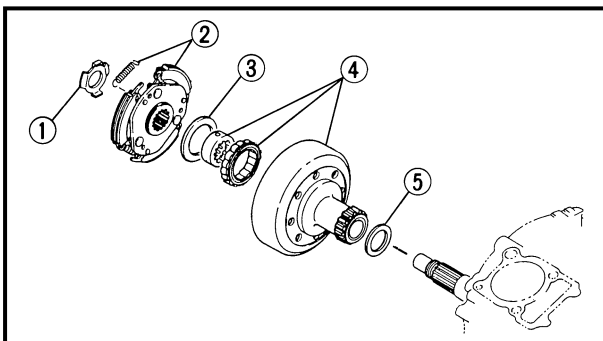
**NOTE:**

Hold the clutch carrier ③ by the Rotor Holder ④ to loosen the nut.



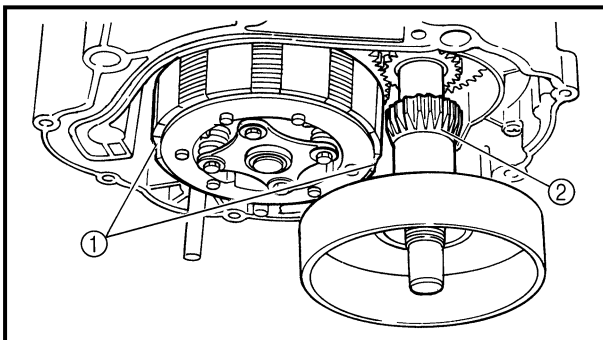
**Rotor holder:**  
P/N. YU-01235, 90890-01235





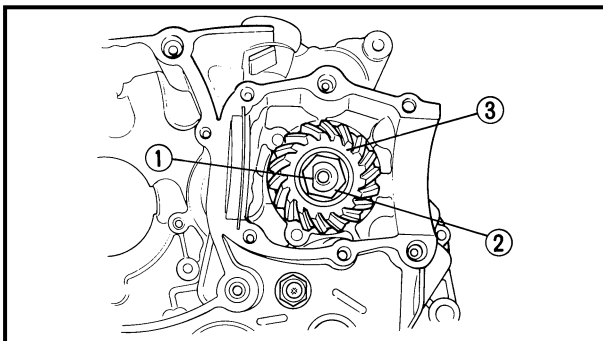
## 5.Remove:

- Lock washer ①
- Clutch carrier assembly ②
- Washer ③
- Clutch housing ④ (primary)
- Washer ⑤

**NOTE:**

The secondary clutch housing has two grooves ① machined into it to permit the primary drive gear behind the primary clutch to clear the secondary clutch. Align one of these grooves with the primary gear ② before removing the primary clutch assembly.

4

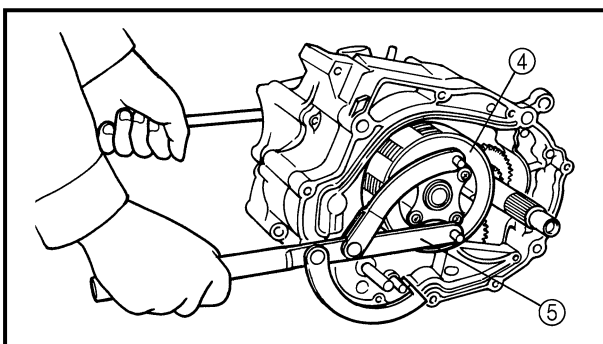


## 6.Flatten:

- Nut tab ① (drive pinion gear)

## 7.Remove:

- Nut ② (drive pinion gear)
- Drive pinion gear ③

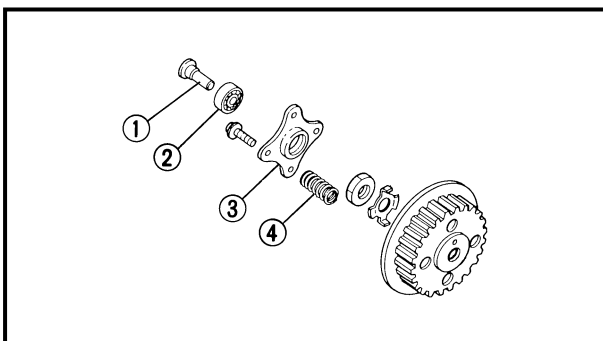
**NOTE:**

- Hold the clutch boss ④ on the secondary clutch by the Rotor Holder ⑤ to loosen the nut (driven pinion gear)



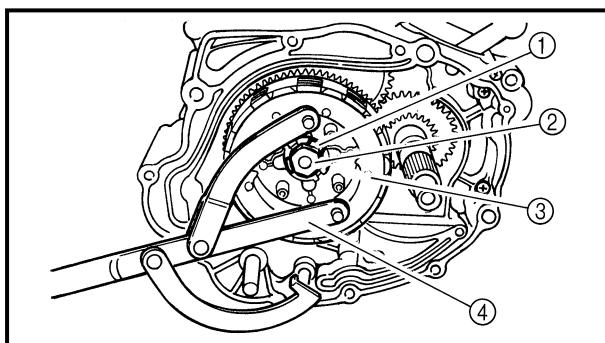
**Rotor holder:**  
P/N. YU-01235, 90890-01235

- Put the engine in 1st, and carry out the operation.



## 8.Remove:

- Push rod ①
- Bearing ②
- Bearing holder ③
- Clutch springs ④



## 9.Straighten:

- Lock washer tab ① (clutch boss)

## 10.Remove:

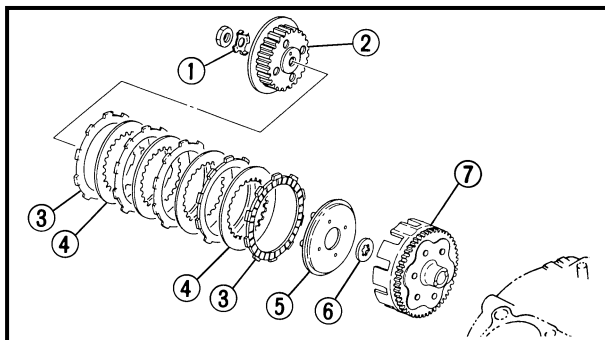
- Nut ② (clutch boss)

**NOTE:**

Hold the clutch boss ③ by the Rotor Holder ④ to loosen the nut.

**Rotor holder:**

P/N. YU-01235, 90890-01235



## 11.Remove:

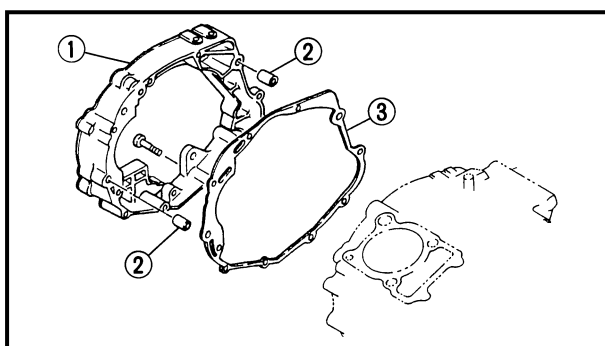
- Lock washer ①
- Clutch boss ②
- Friction plates ③
- Clutch plates ④
- Pressure plate ⑤
- Washer ⑥
- Clutch housing ⑦

**OIL PUMP AND SHIFTER****NOTE:**

With the engine mounted, the oil pump assembly can be maintained by removing the following parts:

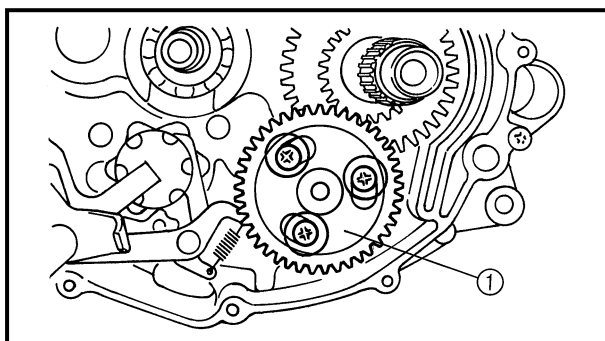
- Starter motor
- Crankcase cover (right)
- Primary and secondary clutches
- Crankcase spacer (right)

4



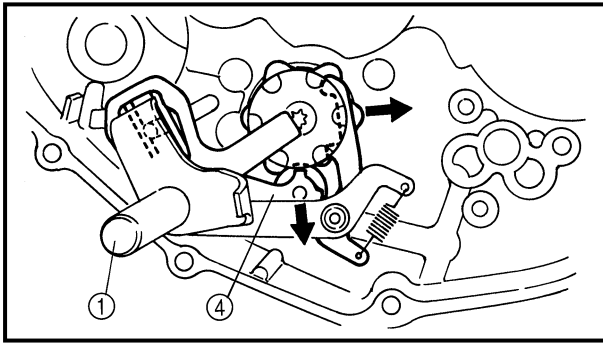
## 1.Remove:

- Crankcase spacer ① (right)
- Dowel pins ②
- Gasket ③



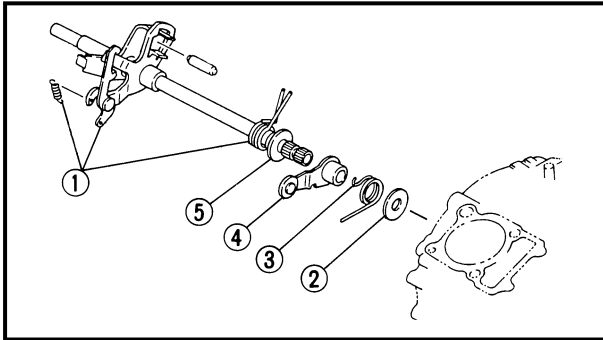
## 2.Remove:

- Oil pump assembly ①
- Gasket



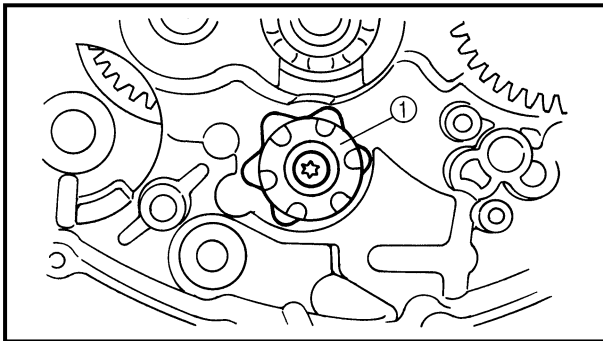
3.Remove:

- Shift lever assembly ①
- Washer ②
- Return spring ③
- Stopper lever ④
- Washer ⑤



**NOTE:**

Push the shift pawl and the stopper lever to the arrow direction and remove them from the segment.

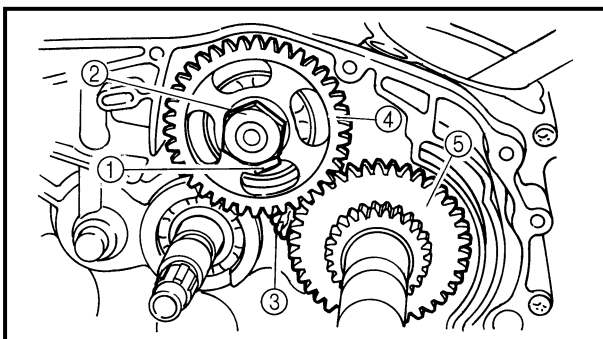


4.Remove:

- Segment ① (shift cam)  
Use the Torx® wrench to remove.

**NOTE:**

When removing the segment, the dowel pin will fall off. Take care not to lose the pin.



## BALANCER DRIVEN GEAR

**NOTE:**

With the engine mounted, the balancer driven gear can be maintained by removing the following parts:

- Starter motor
- Crankcase cover (right)
- Primary and secondary clutches
- Crankcase spacer (right)
- Oil pump assembly

1.Straighten:

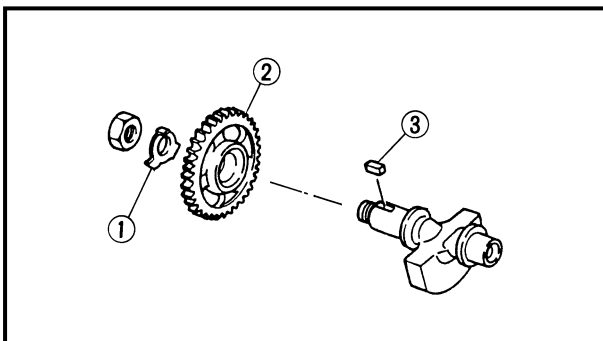
- Lock washer tab ① (driven gear)

2.Remove:

- Nut ② (driven gear)

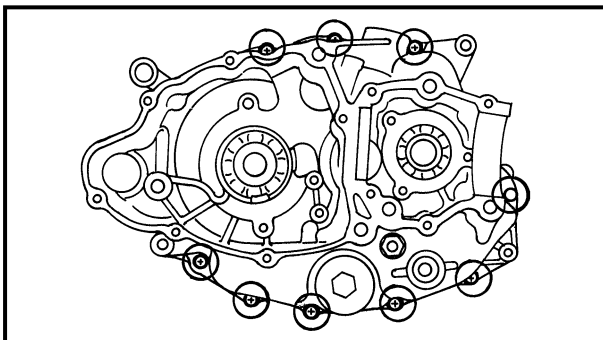
**NOTE:**

Place a folded rag ③ between the teeth of the driven gear ④ and drive gear ⑤ to lock them.



3.Remove:

- Lock washer ①
- Balancer gear ② (driven)
- Straight key ③



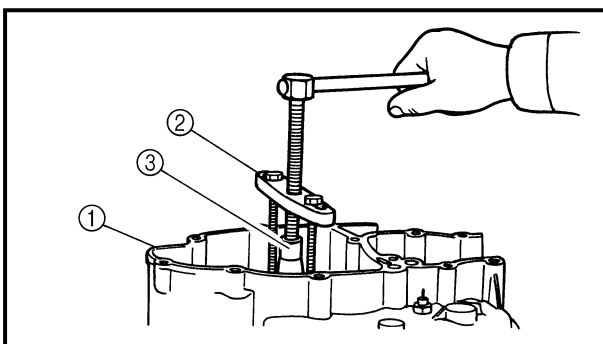
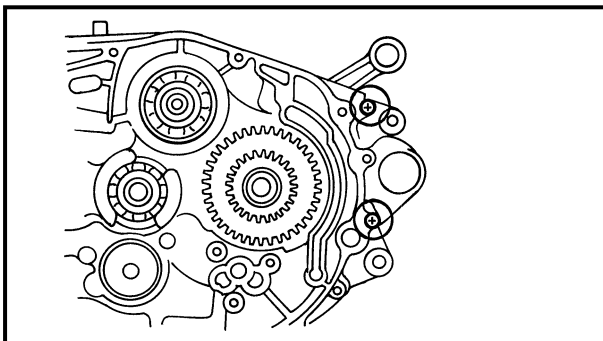
### CRANKCASE (LEFT)

1.Remove:

- Screws (crankcase)

### NOTE:

Working in a crisscross pattern, loosen all screws 1/4 turn each. Remove them after all are loosened.



2.Remove:

- Crankcase ① (left)
- Dowel pins

\*\*\*\*\*

### Removal steps:

- Attach the Crankcase Separating Tool ② and Attachment ③ to the left side crankcase.



**Crankcase Separating Tool:**  
P/N. YU-01135-A, 90890-01135  
**Attachment:**  
P/N. YM-33282, 90890-04089  
(for USA)  
P/N. YM-33278, 90890-04087  
(except for USA)

**NOTE:**

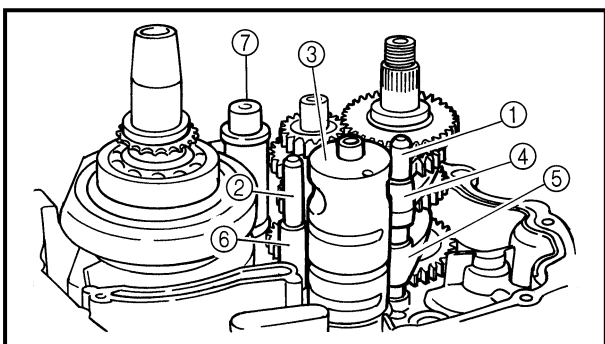
Fully tighten the tool holding bolts, but make sure the tool body is parallel with the case. If necessary, one screw may be backed out slightly to level tool body.

- As pressure is applied, alternately tap on the front engine mounting boss, transmission shafts and balancer shaft.

**CAUTION:**

- Use soft hammer to tap on the case half.
- Tap only on reinforced portions of case.
- Do not tap on gasket mating surface.
- Work slowly and carefully.
- Make sure the case halves separate evenly. If one end "hangs up", take pressure off the push screw, realign, and start over. If the cases do not separate, check for a remaining case screw or fitting. Do not force.

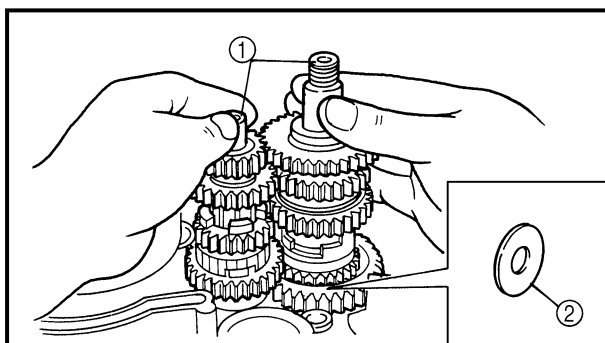
\*\*\*\*\*

**BALANCER SHAFT, TRANSMISSION AND CRANKSHAFT****1.Remove:**

- Guide bar #1 ① (long)
- Guide bar #2 ② (short)
- Shift cam ③
- Shift fork #3 ④
- Shift fork #2 ⑤
- Shift fork #1 ⑥
- Balancer shaft ⑦

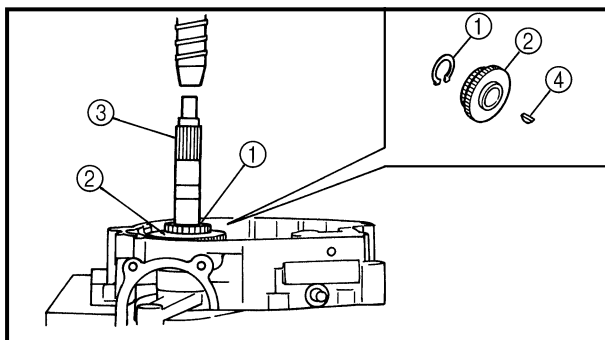
**NOTE:**

Note the position of each part. Pay particular attention to the location and direction of shift forks.



2.Remove:

- Transmission assembly ① (main axle and drive axle)
- Washer ② (drive axle)



3.Remove:

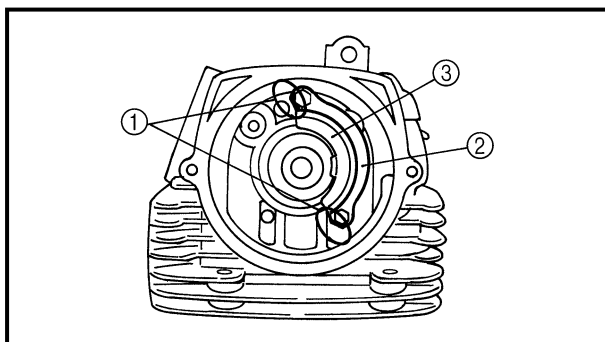
- Circlip ①

4.Remove:

- Balancer drive gear ②
- Crankshaft ③ (from right crankcase)
- Woodruff key ④

**NOTE:**

Use a hydraulic press to remove the balancer drive gear ② from the crankshaft.



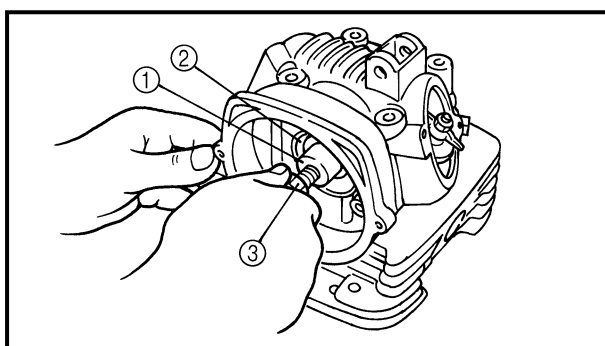
## CYLINDER HEAD

1.Straighten:

- Lock washer tabs ①

2.Remove:

- Lock washer ②
- Retainer ③ (camshaft bushing)

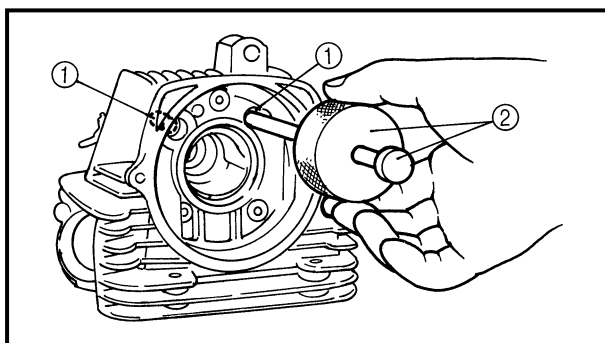


3.Remove:

- Camshaft ①
- Camshaft bushing ②

**NOTE:**

Screw in a suitable length of 10 mm bolt ③ into the thread hole on the camshaft, and pull out the camshaft.



## 4.Remove:

- Rocker arm shafts ①
- Rocker arms (intake/exhaust)

**NOTE:**

Attach the Slide Hammer Set ② to the rocker arm shaft, and then slide out the them.



**Slide hammer set:**

**P/N. YU-01083-A**

**Slide hammer bolt:**

**P/N. 90890-01083**

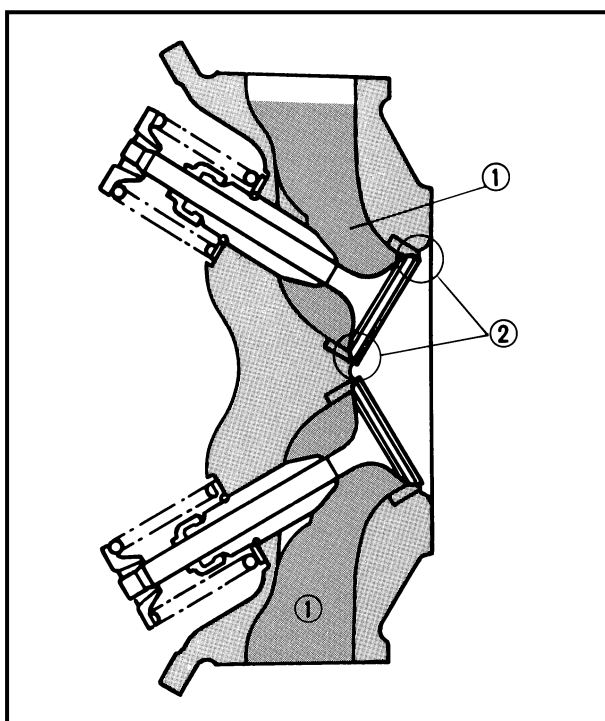
**Weight:**

**P/N. 90890-01084**

## 4

**VALVE****NOTE:**

Before removing the internal parts (valve, valve spring, valve seat etc.) of the cylinder head, the valve sealing should be checked.



## 1.Check:

- Valve sealing

Leakage at valve seat → Inspect the valve face, valve seat and valve seat width.

Refer to "INSPECTION AND REPAIR - VALVE SEAT".

\*\*\*\*\*

**Valve seat checking steps:**

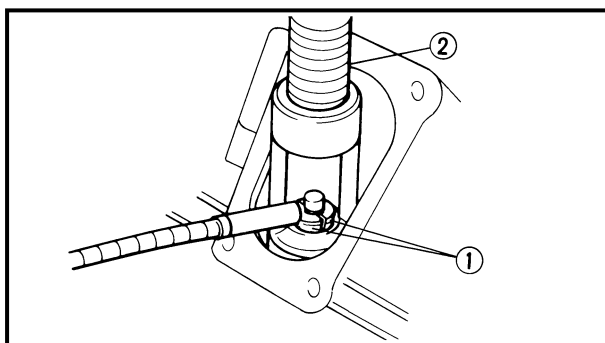
- Pour a clean solvent ① into the intake and exhaust ports.

- Check the valve seating.

There should be no leakage at the valve seat ②.

\*\*\*\*\*





2.Remove:

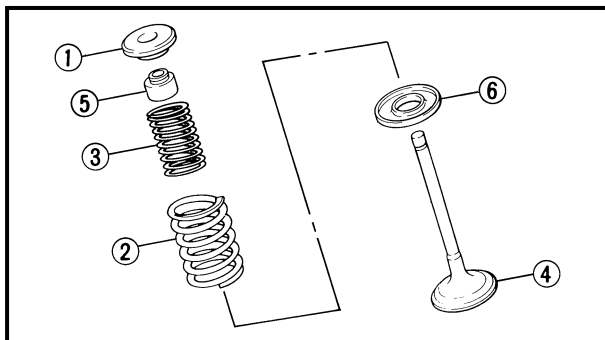
- Valve cotteners ①

**NOTE:**

Attach the Valve Spring Compressor ② between the valve spring seat and cylinder head to remove the valve cotteners.



**Valve spring compressor:**  
P/N. YM-04019, 90890-04019

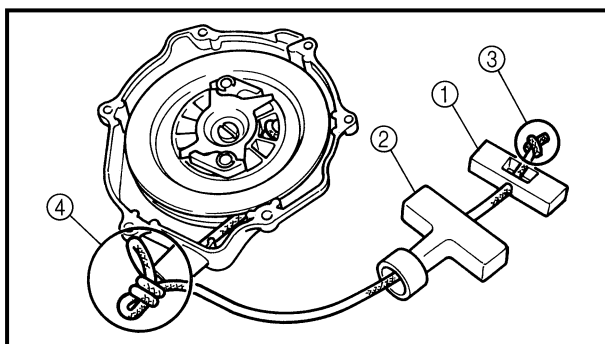


3.Remove:

- Valve spring seat ① (upper)
- Valve spring ② (outer)
- Valve spring ③ (inner)
- Valve ④
- Valve stem seal ⑤
- Valve spring seat ⑥ (lower)

**NOTE:**

Identify each part position very carefully so that it can be reinstalled in its original place.



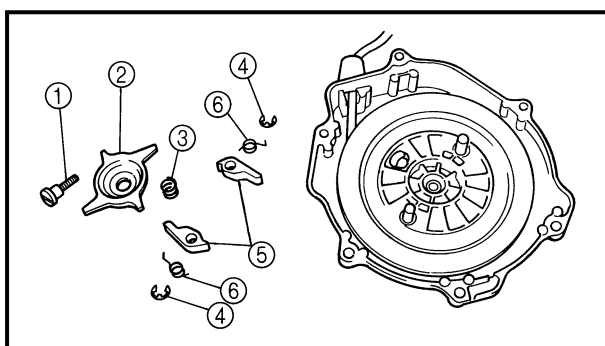
## RECOIL STARTER

1.Remove:

- Cap ①
- Starter handle ②

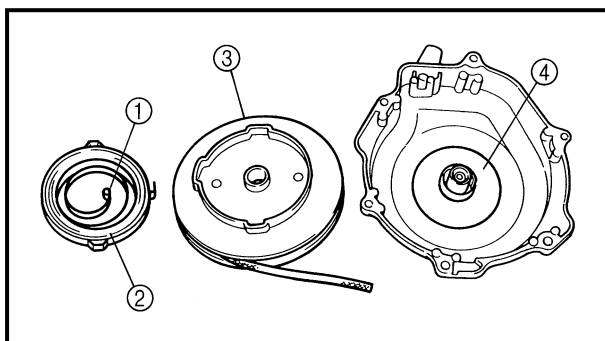
**NOTE:**

Before untying knot ③, pull out the rope long enough to make knot ④ on the rope so that the rope is not pulled into the case.



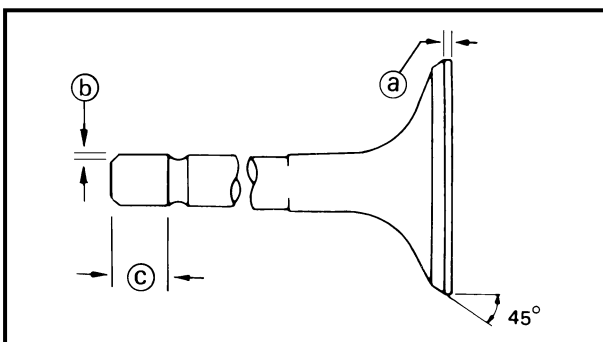
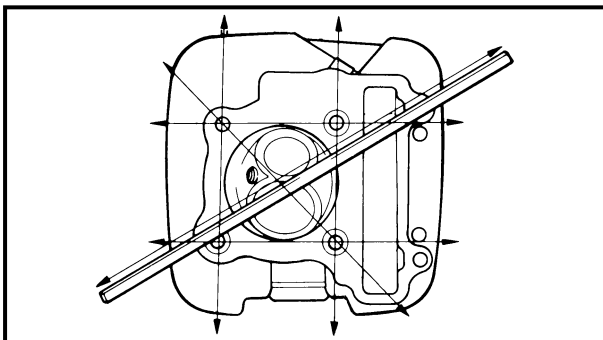
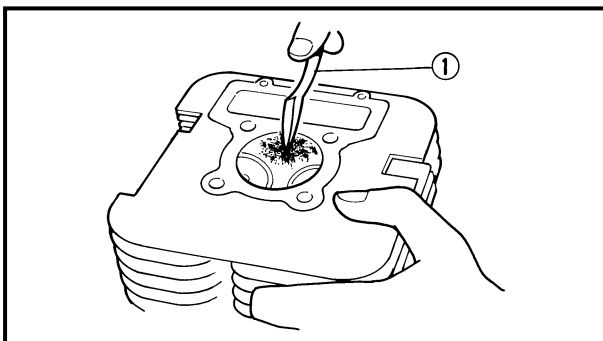
2.Remove:

- Bolt ①
- Drive plate ②
- Spring ③
- Circlip ④
- Drive pawl ⑤
- Spring (drive pawl) ⑥



3.Remove:

- Starter spring ①
- Starter spring case ②
- Sheave drum ③
- Plate ④



## INSPECTION AND REPAIR

### CYLINDER HEAD

#### 1.Eliminate:

- Carbon deposit  
Use a rounded scraper ①.

#### NOTE:

Do not use a sharp instrument to avoid damaging or scratching:

- Spark plug threads
- Valve seat
- Cylinder head

#### 2.Measure:

- Cylinder head warpage  
Out of specification → Resurface/Replace.



**Cylinder head warp:**  
**Less than 0.10 mm (0.004 in)**

### INTAKE AND EXHAUST VALVE

#### 1.Check:

- Valve face
- Stem end  
Wear/Pitting/Out of specification → Replace.



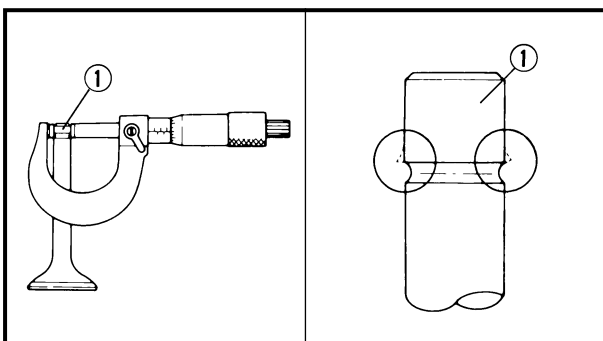
**Minimum thickness (service limit)**

①:  
**0.8 mm (0.031 in)**

**Beveled ②:**  
**0.5 mm (0.020 in)**

**Minimum length (service limit)**

③:  
**4.0 mm (0.157 in)**

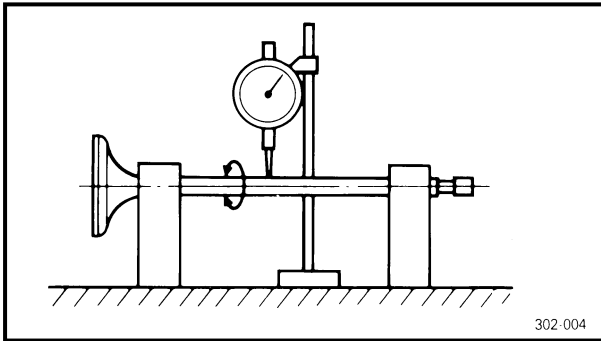


#### 2.Inspect:

- Valve stem end ①  
Mushroom shape/Larger diameter than rest of stem → Replace valve, valve guide, and oil seal.

#### NOTE:

Deburr any deformed valve stem end ①.  
Use an oil stone to smooth the stem end.

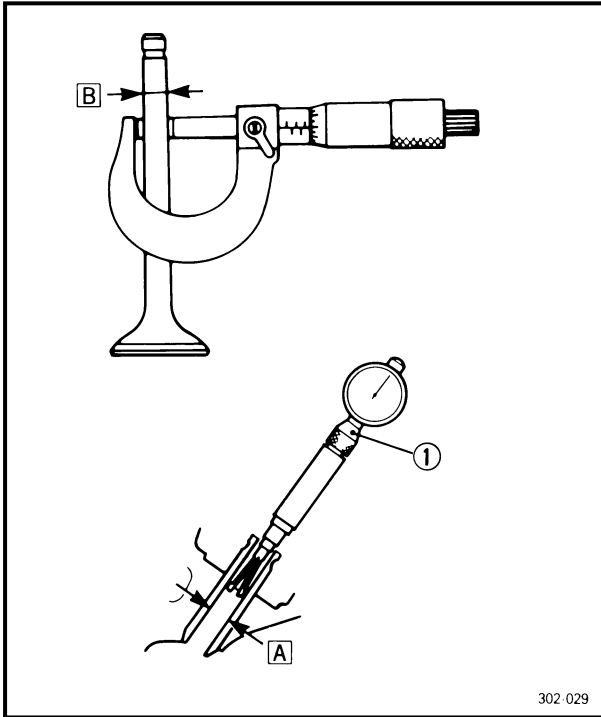


## 3.Measure:

- Valve stem runout  
Out of specification → Replace.



**Stem runout:**  
**Less than: 0.03 mm (0.0012 in)**



## 4.Measure:


- Valve stem clearance

**Valve stem clearance =**

**Valve guide inside diameter [A] –**  
**Valve stem diameter [B]**

Out of specification → Replace either valve and/or guide.

Use a Micrometer and Bore Gauge ①.

	Valve stem clearance	Limit
<b>Intake</b>	<b>0.010 ~ 0.037 mm</b> <b>(0.0004 ~ 0.0015 in)</b>	<b>0.08 mm</b> <b>(0.0031 in)</b>
<b>Exhaust</b>	<b>0.025 ~ 0.052 mm</b> <b>(0.0010 ~ 0.0020 in)</b>	<b>0.10 mm</b> <b>(0.0039 in)</b>

## VALVE GUIDE

## NOTE:

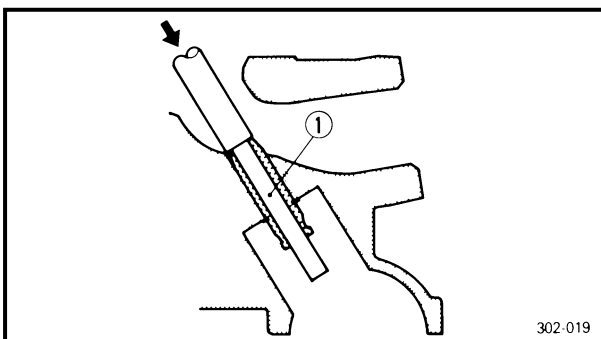
- Always replace the valve guide if the valve is replaced.
- Always replace the oil seal if the valve is removed.

## 1.Inspect:

- Valve guide  
Wear/Oil leakage into cylinder → Replace.

## 2.Remove:

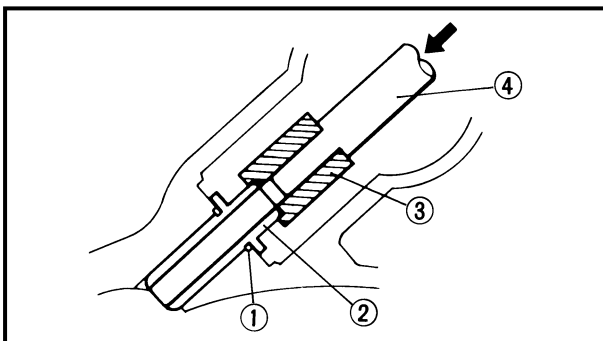
- Valve guide  
Use the Valve Guide Remover ①.



**Valve guide remover (6.0 mm):**  
**P/N. YM-04064-A, 90890-04064**

## NOTE:

Heat the head in an oven to 100C (212F) to ease guide removal and installation and to maintain correct interference fit.



## 3.Install:

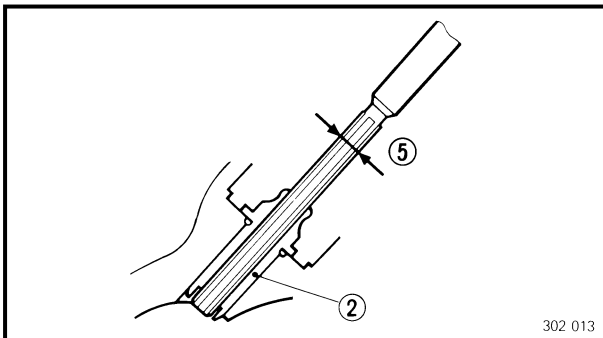
- Circlip ① (new)
- Valve guide ② (new)  
Use the Valve Guide Installer ③ with the Valve Guide Remover ④.

**Valve guide installer:**

P/N. YM-04065-A, 90890-04065

**Valve guide remover (6.0 mm):**

P/N. YM-04064-A, 90890-04064



## 4.Bore valve guide ② to obtain proper valve stem clearance.

Use the Valve Guide Reamer ⑤ (6.0 mm)

**Valve guide reamer (6.0 mm):**

P/N. YM-04066, 90890-04066

**NOTE:**

Reface the valve seat after installing the valve guide.

4

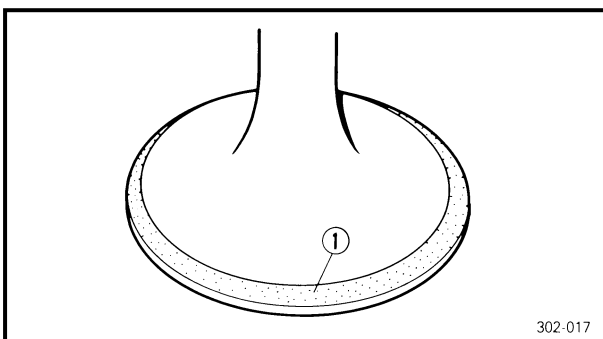
**VALVE SEAT**

## 1.Eliminate:

- Carbon deposit  
(from valve seat and valve face)

## 2.Inspect:

- Valve seat  
Pitting/Wear → Reface valve seat.



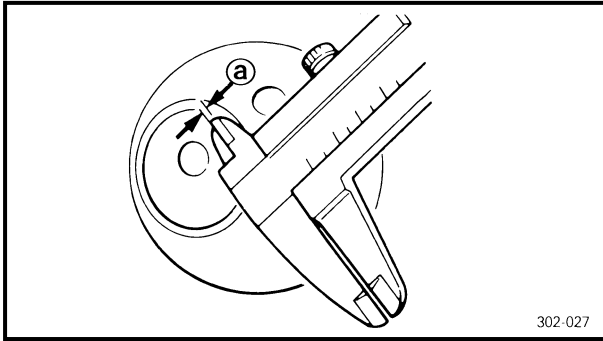
## 3.Measure:

- Valve seat width  
Out of specification → Reface valve seat.

\*\*\*\*\*

**Measurement steps:**

- Apply the Mechanic's bluing dye ① (Dykem) to the valve face.
- Install the valve into the cylinder head.




● Press the valve through the valve guide and onto the valve seat to make a clear pattern.

● Remove the valve from the cylinder head.

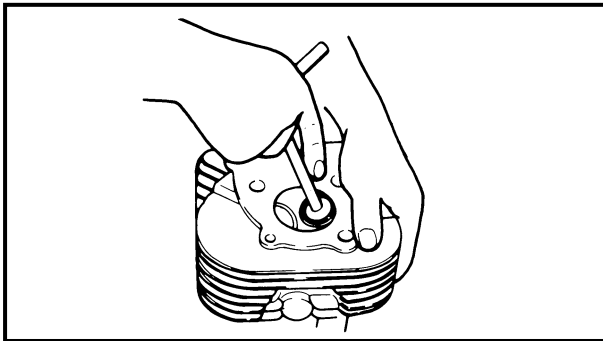
● Measure the valve seat width ①.

When the valve seat and valve face make contact, bluing will be applied to the valve face.

	Valve seat width	Limit
Intake	0.9 ~ 1.1 mm (0.035 ~ 0.043 in)	1.6 mm (0.063 in)
Exhaust		

● If the valve seat width is too wide, too narrow, or seat has not centered. The valve seat must be refaced.


\*\*\*\*\*



#### 4. Reface:

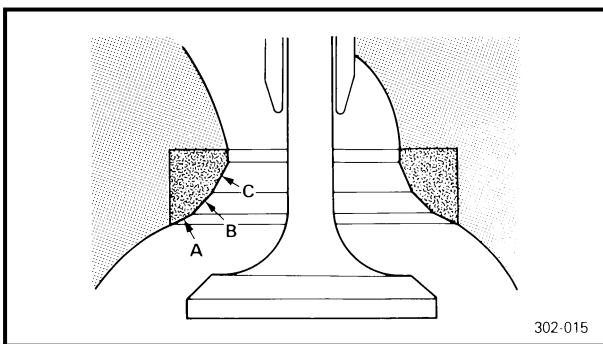
● Valve seat

Use 30°, 45° and 60° Valve Seat Cutter.

	<b>Valve seat cutter set: P/N. YM-91043-B</b>
---	---

#### CAUTION:

Remove just enough material to achieve satisfactory seat. When twisting cutter, keep an even downward pressure to prevent chatter marks.



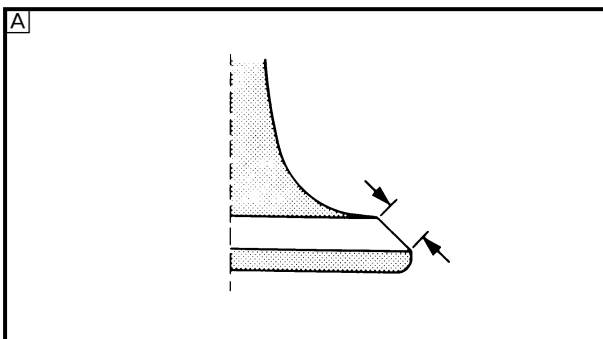
Cut sections as follows	
Section	Cutter
A	30°
B	45°
C	60°

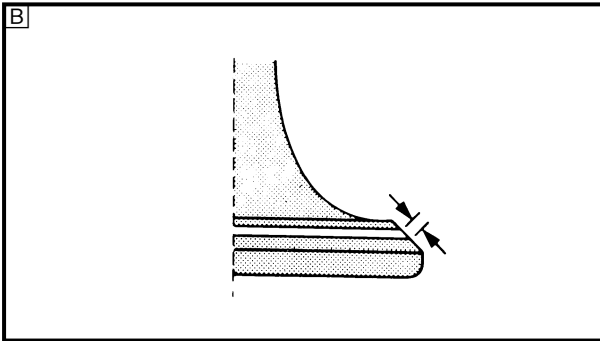
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#### Valve seat refacing steps:

Ⓐ Valve face indicates that valve seat is centered on valve face but is too wide.

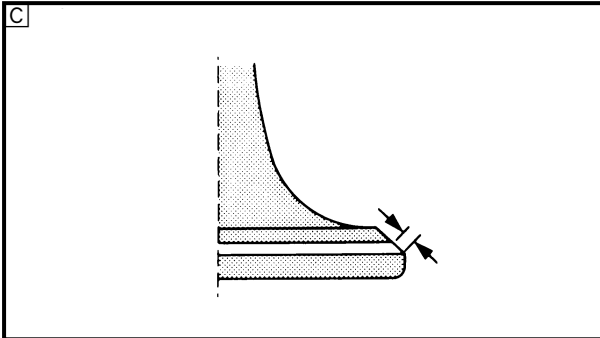
Valve seat cutter set		Desired result
Use lightly	30° cutter	To reduce valve seat width to 1.0 mm (0.04 in)
	60° cutter	





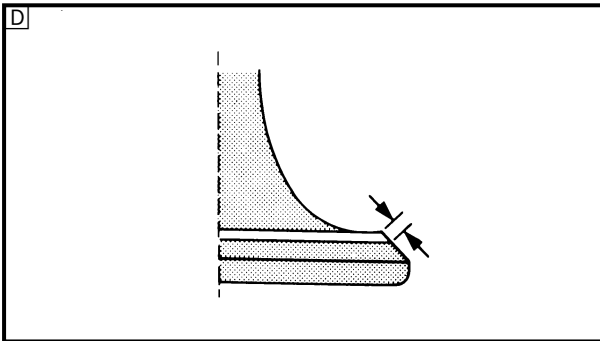
- B** Valve seat is in the middle of the valve face but too narrow.

Valve seat cutter set		Desired result
Use	45° cutter	To achieve a uniform valve seat width of 1.0 mm (0.04 in)



- C** Valve seat is too narrow and right up near valve margin.

Valve seat cutter set		Desired result
Use	30° cutter	To center the seat and to achieve its width of 1.0 mm (0.04 in)
	45° cutter	



- D** Valve seat is too narrow and is located down near the bottom edge of the valve face.

Valve seat cutter set		Desired result
Use	60° cutter, first	To center the seat and increase its width.
	45° cutter	

\*\*\*\*\*

4

#### 5.Lap:

- Valve face
- Valve seat

#### NOTE:

After refacing the valve seat or replacing the valve and valve guide, the valve seat and valve face should be lapped.

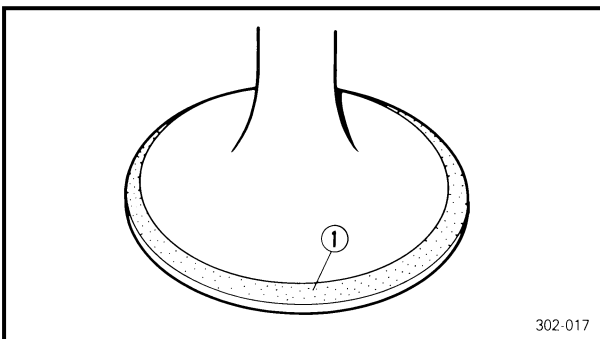
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#### Valve lapping steps:

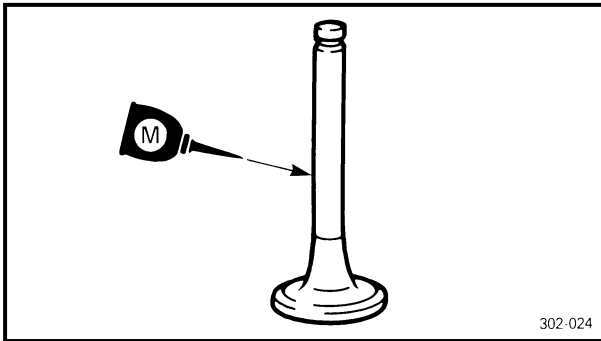
- Apply a coarse lapping compound ① to the valve face.

#### CAUTION:

Be sure no compound enters the gap between the valve stem and guide.



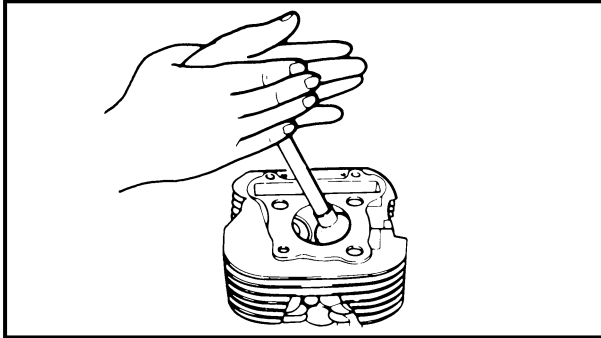
302-017



- Apply a molybdenum disulfide oil to the valve stem.
- Install the valve into the cylinder head.
- Turn the valve until the valve face and valve seat are evenly polished, then clean off all compound.

**NOTE:**

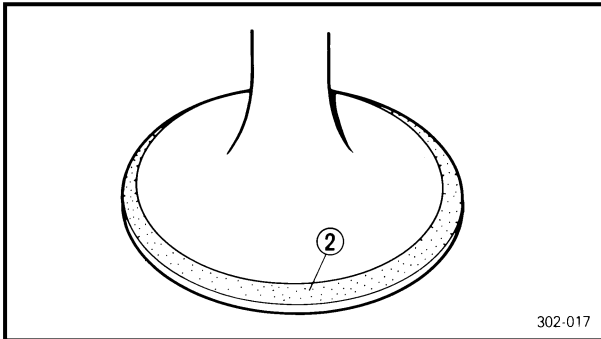
To obtain the best lapping result, lightly tap the valve seat while rotating the valve back and forth between your hand.



- Apply a fine lapping compound to the valve face and repeat the above steps.

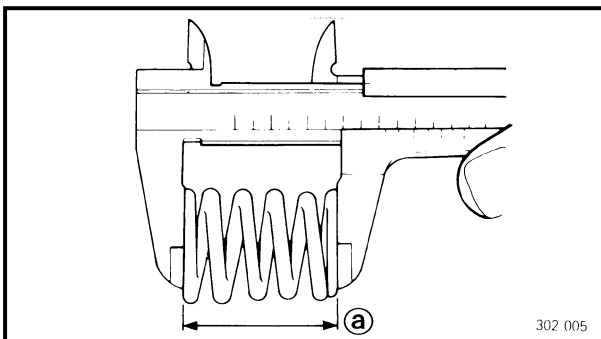
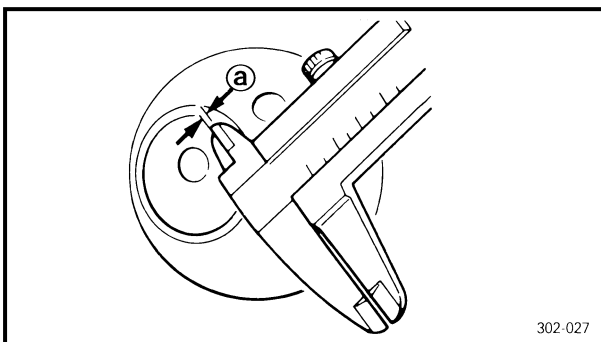
**NOTE:**

Be sure to clean off all compound from the valve face and valve seat after every lapping operation.



- Apply the Mechanic's bluing dye ② (Dykem) to the valve face.
- Install the valve into the cylinder head.
- Press the valve through the valve guide and onto the valve seat to make a clear pattern.
- Remove the valve from the cylinder head.
- Measure the valve seat width ③ again. If the valve seat width is out of specification, reface and lap the valve seat.

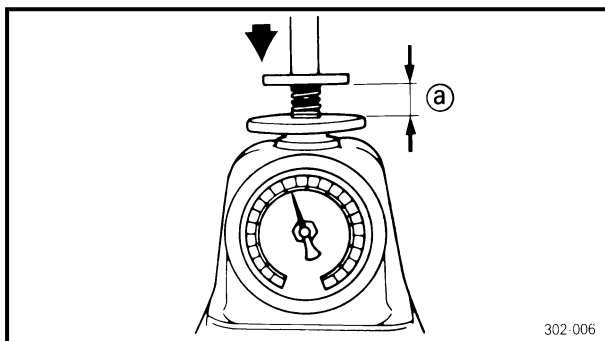
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**VALVE SPRING****1.Measure:**

- Valve spring free length ③ (inner and outer)  
Out of specification → Replace.

**Valve spring free length**

Inner spring (IN/EX)	Outer spring (IN/EX)
35.5 mm (1.4 in)	37.2 mm (1.46 in)



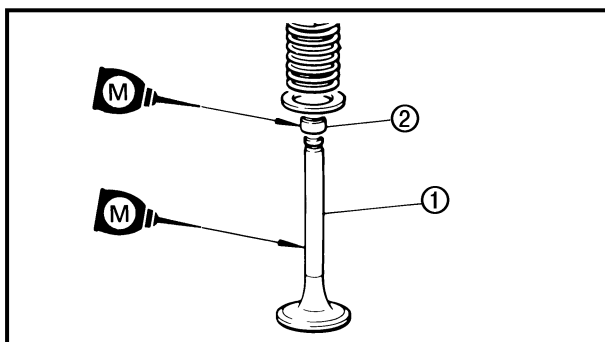
## 2.Measure:

- Valve spring installed force  
Out of specification → Replace inner and outer springs as a set.

① Installed length

Valve spring installed force	
Inner spring (IN/EX)	8.4 ~ 10.2 kg (18.5 ~ 22.5 lb) at 30.5 mm (1.2 in)
Outer spring (IN/EX)	16.6 ~ 20.4 kg (36.6 ~ 45.0 lb) at 32.0 mm (1.26 in)


4



## VALVE INSTALLATION

## 1.Lubricate:

- Valve stem ①
- Oil seal ②

	Molybdenum disulfide oil:
---	---------------------------

## 2.Install:

- Intake valves
- Exhaust valves

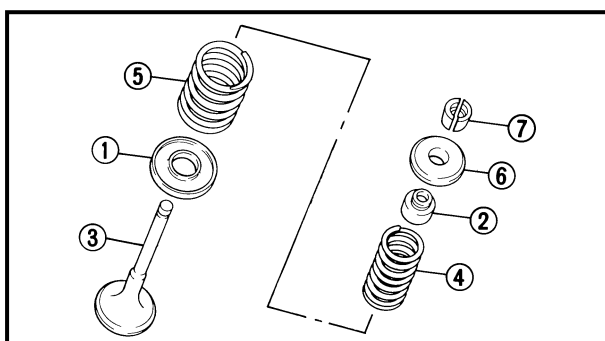
**NOTE:**


Be sure to reinstall in its original place.

## 3.Install:

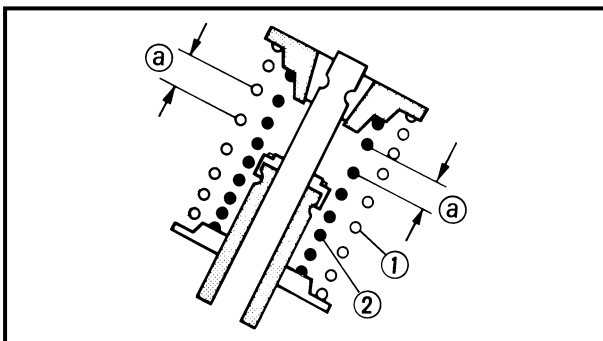
- Valve spring seat ① (lower)
- Oil seal ②
- Valve ③
- Valve spring ④ (inner)
- Valve spring ⑤ (outer)
- Valve spring seat ⑥ (upper)
- Valve cotters ⑦

Use the Valve Spring Compressor.



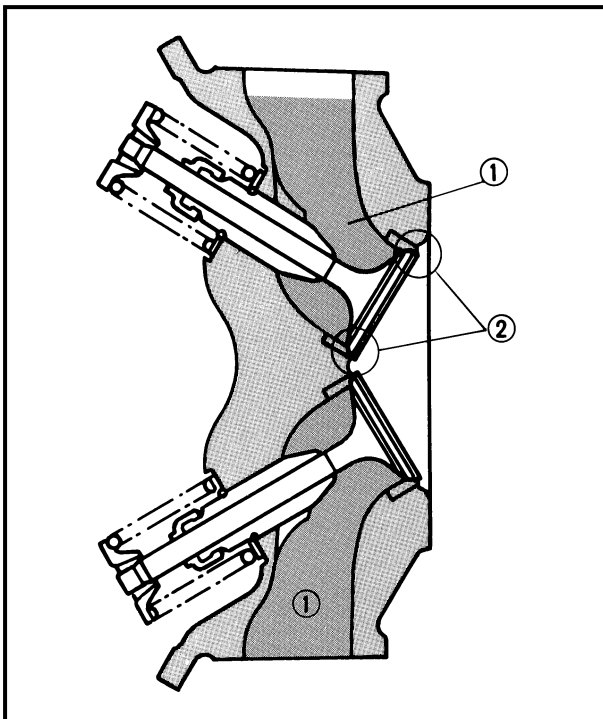
	Valve spring compressor: P/N. YM-04019, 90890-04019
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**NOTE:**

All valve springs must be installed with the larger pitch Ⓐ upward as shown.

- ① Outer spring
- ② Inner spring

**4.Check:**

- Valve sealing  
Leakage at valve seat → Reface, relap or replace valve, relap.  
Refer to "VALVE SEAT".

\*\*\*\*\*

**Valve seat checking steps:**

- Pour a clean solvent ① into the intake and exhaust ports.
- Check the valve sealing, there should be no leakage at the valve seat ②.

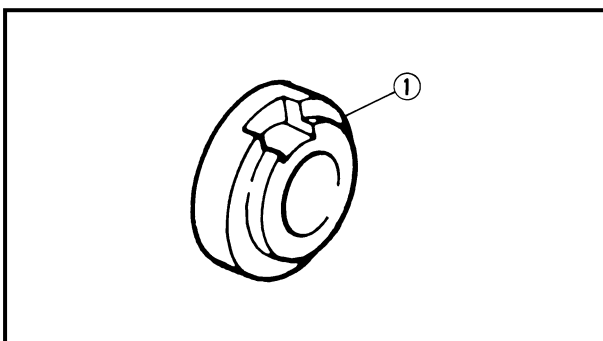
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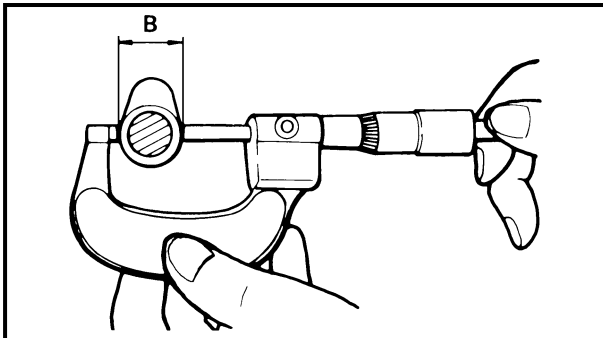
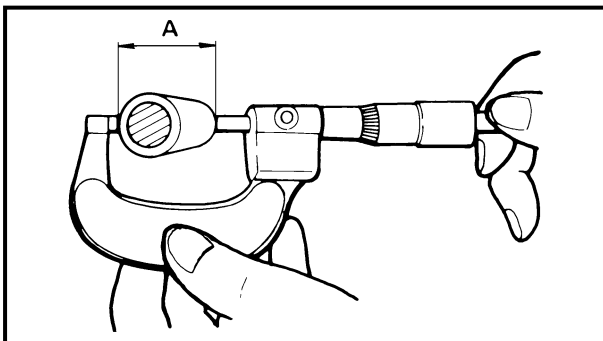
**Relapping steps:**

- Reassemble head parts.
- Repeat lapping steps using fine lapping compound.
- Clean all parts thoroughly.
- Reassemble and check for leakage again using solvent.
- Repeat steps as often as necessary to effect a satisfactory seal.

\*\*\*\*\*

**CAM SHAFT****1.Inspect:**

- Camshaft bushing ①  
Wear/Damage → Replace.



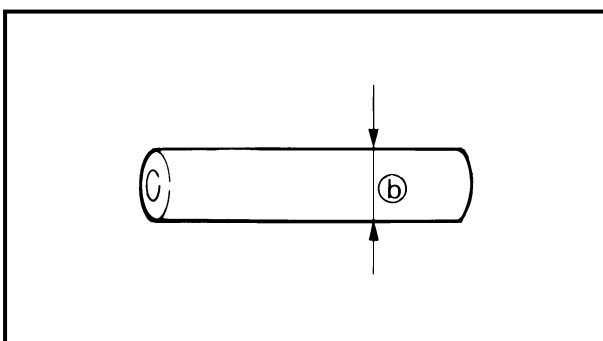
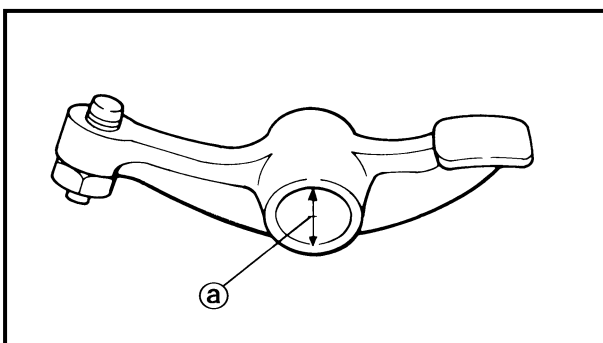
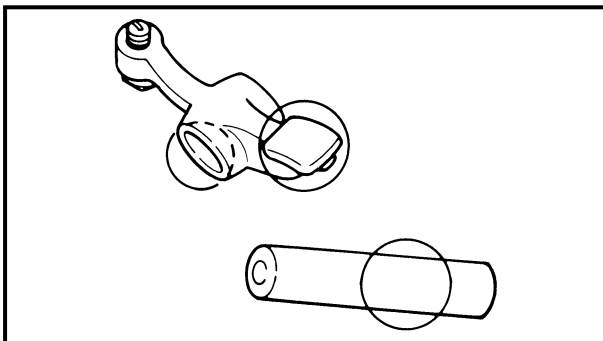
## 2. Inspect:

- Cam lobes  
Pitting/Scratches/Blue discoloration → Replace.

## 3. Measure:

- Cam lobes  
Use a Micrometer.  
Out of specification → Replace.

	Cam lobe Limit "A"	Cam lobe Limit "B"
Intake	36.437 mm (1.435 in)	30.031 mm (1.182 in)
Exhaust	36.482 mm (1.436 in)	30.152 mm (1.187 in)



## ROCKER ARM AND ROCKER ARM SHAFT

## 1. Inspect:

- Rocker arm shafts
- Rocker arms  
Wear/Damage → Replace.

\*\*\*\*\*

## Rocker arm shaft and arm inspection steps:

- Inspect the two areas on the rocker arm for signs of unusual wear.
  - Rocker arm shaft hole.
  - Cam-lobe-contact surface.
 Excessive wear → Replace.
- Inspect the surface condition of the rocker arm shaft.  
Pitting/Scratches/blue discoloration → Replace/Check lubrication.
- Measure the inside diameter (a) of the rocker arm hole.  
Out of specification → Replace.



**Rocker arm inside diameter:**  
12.000 ~ 12.018 mm  
(0.4724 ~ 0.4731 in)

- Measure the outside diameter (b) of the rocker arm shaft.  
Out of specification → Replace.



**Rocker arm shaft outside diameter:**  
11.985 ~ 11.991 mm  
(0.4718 ~ 0.4721 in)



- Calculate the clearance by subtracting the rocker-arm-shaft outside diameter from the rocker-arm inside diameter.

**Arm-to-shaft clearance =**

**Rocker arm inside diameter ② –  
Rocker arm shaft outside diameter ③**

Out of specification → Replace as a set.

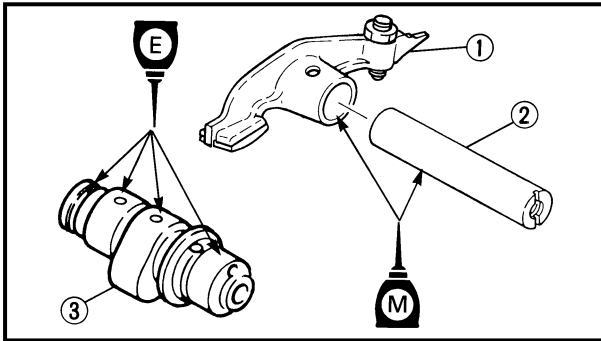


**Arm-to-shaft clearance:**

**0.009 ~ 0.037 mm  
(0.0004 ~ 0.0013 in)**

**<Limit>:**

**0.037 mm (0.0015 in)**



2.Lubricate:

- Rocker arms ①
- Rocker arm shafts ②
- Cam shaft ③ (cam lobe/journal)



**Rocker arms/rocker arm shafts:**

**Molybdenum disulfide oil**

**Cam shaft:**

**SAE 10W30 motor oil**

3.Install:

- Rocker arms
- Rocker arms shafts

**NOTE:**

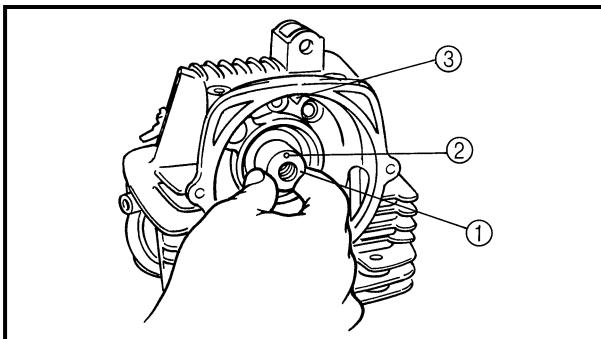
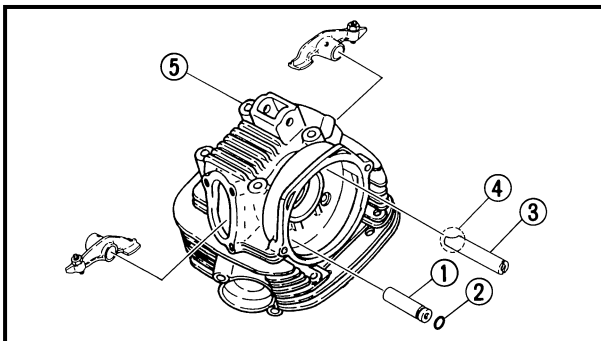
- Thread hole of the rocker arm shaft should be placed outside.
- Install the shorter rocker arm shaft ① (with O-ring ②) on the exhaust side and the longer shaft ③ (with cutaway ④) on the intake side.
- Align the slit ④ on the rocker arm shaft (intake) with the cylinder head bolt hole ⑤ and install the rocker arm shaft.

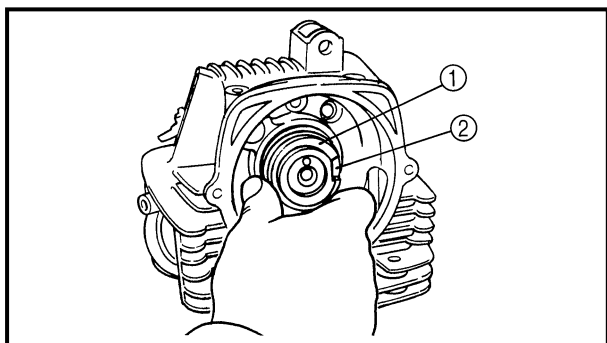
4.Install:

- Camshaft ①  
(to cylinder head)

**NOTE:**

The pin ② on the end of the camshaft must align with the timing mark ③ on the cylinder head.





5.Install:

- Camshaft bushing ①

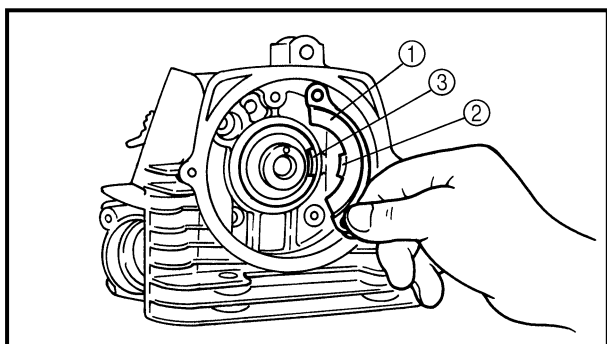
**NOTE:**

The cut-out portion ② of the bushing must be flush with the cylinder head.

**CAUTION:**

Do not cock the bushing during installation. The bushing must be perpendicular to the camshaft during installation.

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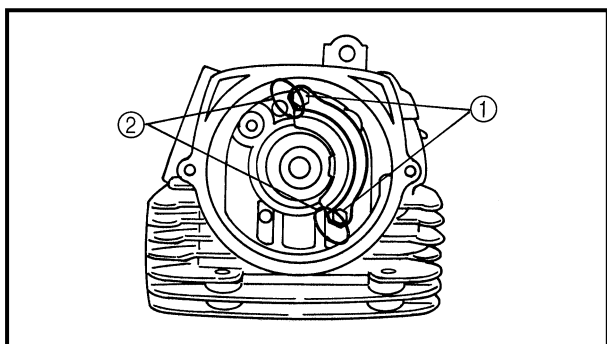


6.Install:

- Retainer ① (camshaft bushing)
- Lock washer (new)

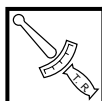
**NOTE:**

Be sure that the projection ② on the retainer aligns with the cut-out portion ③ on the camshaft bushing.



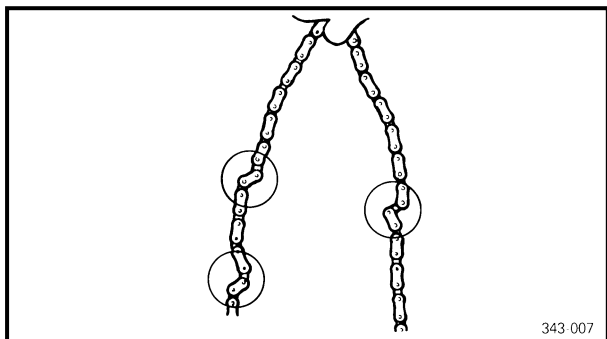
7.Tighten:

- Bolts ① (camshaft bushing retainer)



**Bolts (camshaft bushing retainer):**  
8 Nm (0.8 m • kg, 5.8 ft • lb)

8.Bend the lock washer tabs ②.

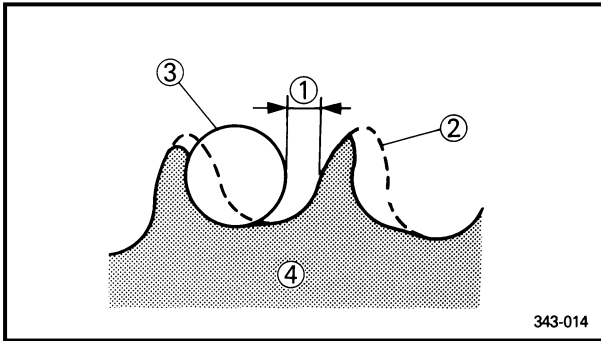


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**TIMING CHAIN**

1.Inspect:

- Timing chain  
Chain stretch/Stiff/Cracks → Replace.

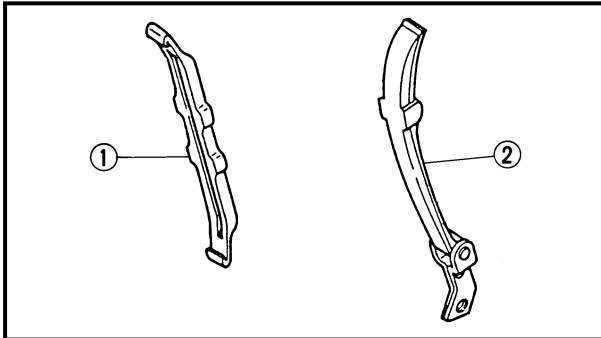


## CAM SPROCKET AND CAM DRIVE SPROCKET

### 1. Inspect:

- Cam sprocket
  - Cam drive sprocket (crank shaft)
- Wear/Damage → Replace cam sprocket and timing chain as a set.

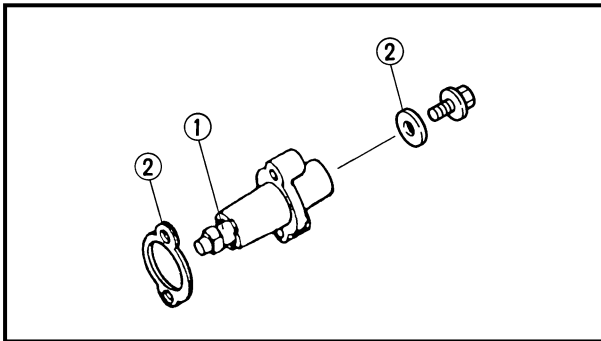
- ① 1/4 tooth
- ② Correct
- ③ Roller
- ④ Sprocket



## TIMING CHAIN GUIDE

### 1. Inspect:

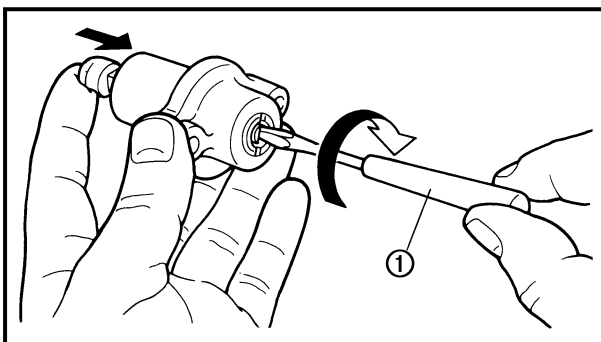
- Timing chain guide ① (exhaust)
  - Timing chain guide ② (intake)
- Wear/Damage → Replace.



## TIMING CHAIN TENSIONER

### 1. Inspect:

- Chain tensioner rod ①
  - Gaskets ②
- Damage/Wear → Replace.



### 2. Check:

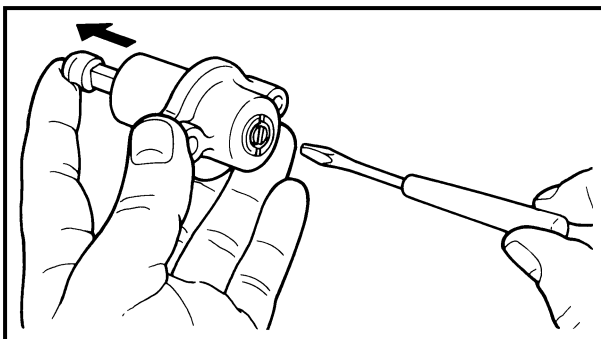
- Timing chain tensioner play

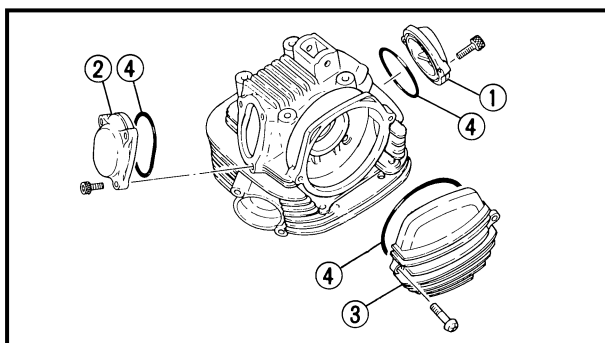
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### Checking steps:

- While pressing the tensioner rod lightly with fingers, use a thin screwdriver ① and wind the tensioner rod up fully clockwise.
- When releasing the screwdriver by pressing lightly with fingers, make sure that the tensioner rod will come out smoothly.
- If not, replace the tensioner assembly.

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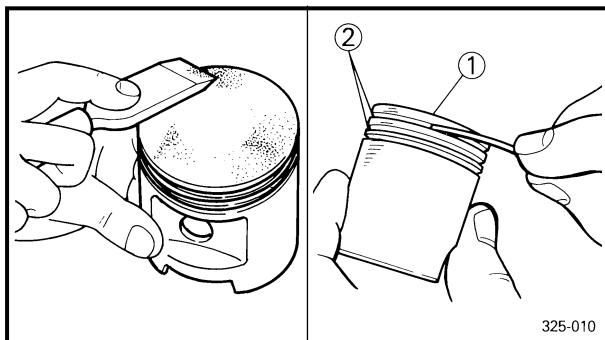




### TAPPET COVER AND CAM SPROCKET COVER

#### 1. Inspect:

- Tappet covers (intake ① and exhaust ②)
  - Cam sprocket cover ③
  - O-rings ④
- Cracks/Damage → Replace.



### CYLINDER AND PISTON

#### 1. Eliminate:

- Carbon deposits  
(from the piston crown and ring grooves.)

#### 2. Inspect:

- Cylinder and piston walls  
Vertical scratches → Rebore or replace cylinder and piston.

#### 3. Measure:

- Piston-to-cylinder clearance

\*\*\*\*\*

#### Measurement steps:

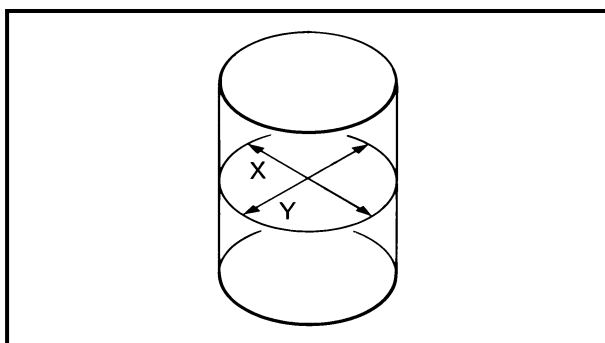
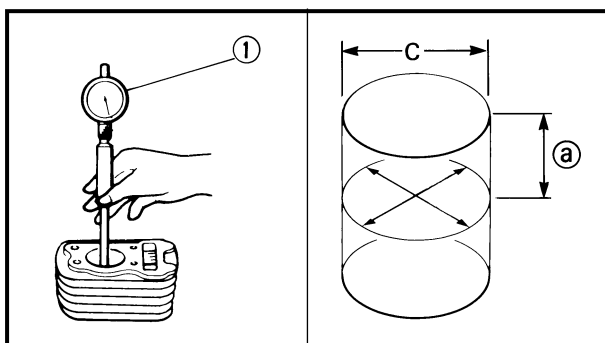
##### First steps


- Measure the cylinder bore "C" with a cylinder bore gauge ①.

① 40 mm (1.6 in) from the cylinder top

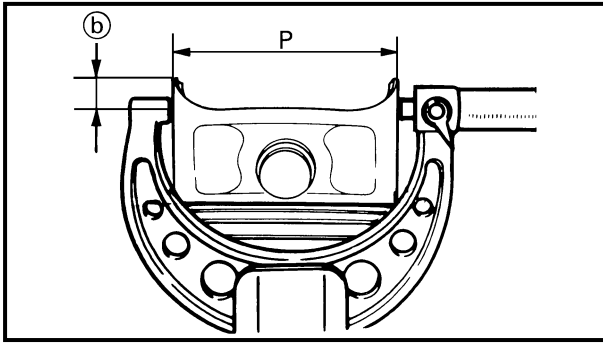
#### NOTE:

Measure the cylinder bore "C" in parallel to and at right angles to the cylinder matching surface. Then, find the average of the measurements.



	Standard	Wear limit
Cylinder bore "C"	70.97 ~ 71.02 mm (2.794 ~ 2.796 in)	71.10 mm (2.799 in)
$C = \frac{X+Y}{2}$		

- If out of the specification, rebore or replace the cylinder, and the piston and piston rings as a set.

**2nd steps**

- Measure the piston skirt diameter "P" with a micrometer.

⑥ 4 mm (0.16 in) from the piston bottom edge

Piston skirt Diameter "P"	
Standard	70.92 ~ 70.97 mm (2.792 ~ 2.794 in)
Oversize 2	71.50 mm (2.815 in)
Oversize 4	72.00 mm (2.846 in)

- If out of the specification, replace the piston and piston rings as a set.

**3rd steps**

- Find the piston-to-cylinder clearance with following formula.

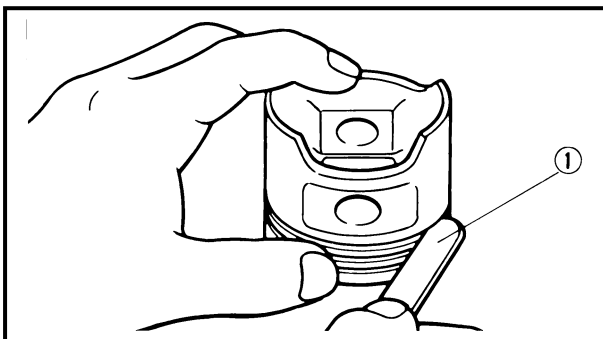
Piston-to-cylinder clearance =

Cylinder bore "C" –  
Piston skirt diameter "P"

	<b>Piston-to-cylinder clearance:</b>
	0.04 ~ 0.06 mm (0.0016 ~ 0.0024 in)
	< Limit >: 0.15 mm (0.0059 in)

- If out of the specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.

\*\*\*\*\*

**PISTON RING AND PISTON PIN****Piston ring****1.Measure:**

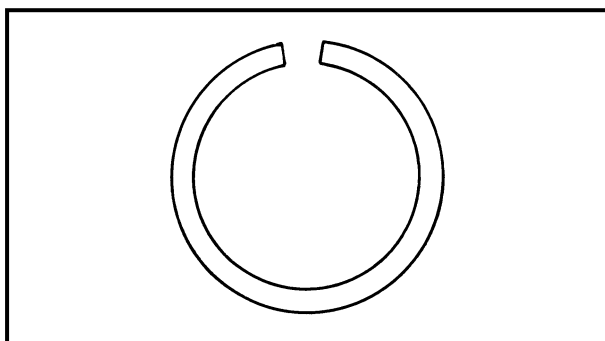
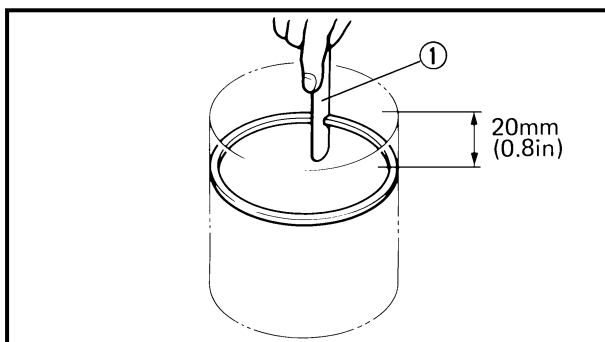
- Side clearance  
Use the Feeler Gauge ①.  
Out of specification → Replace piston and/or rings as a set.

**NOTE:**

Eliminate carbon deposits from the piston ring grooves and rings before measuring the side clearance.



4



	Side clearance	
	Standard	Limit
<b>Top ring</b>	0.03 ~ 0.07 mm (0.001 ~ 0.003 in)	0.12 mm (0.005 in)
<b>2nd ring</b>	0.02 ~ 0.06 mm (0.0008 ~ 0.0024 in)	0.12 mm (0.005 in)

## 2.Position:

- Piston ring  
(into cylinder)

**NOTE:**

Insert the ring into the cylinder, and push it approximately 20 mm (0.8 in) into the cylinder. Push the ring with the piston crown so that the ring will be at a right angle to the cylinder bore.

## 3.Measure:

- End gap  
Use a Feeler Gauge ①  
Out of specification → Replace rings as set.

	End gap	
	Standard	Limit
<b>Top ring</b>	0.15 ~ 0.30 mm (0.006 ~ 0.012 in)	0.4 mm (0.016 in)
<b>2nd ring</b>	0.15 ~ 0.30 mm (0.006 ~ 0.012 in)	0.4 mm (0.016 in)
<b>Oil ring</b>	0.2 ~ 0.7 mm (0.008 ~ 0.028 in)	—

**NOTE:**

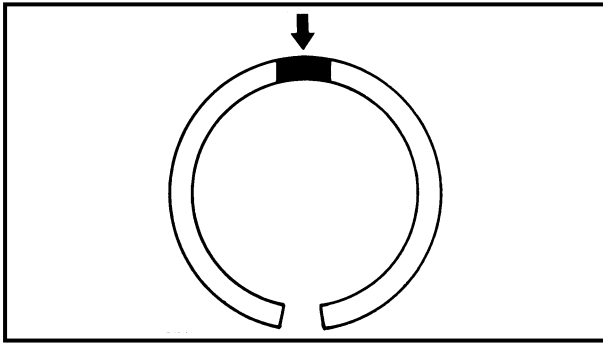
You cannot measure end gap on expander spacer of oil control ring. If oil control ring rails show excessive gap, replace all three rings.

**Piston ring oversize**

- Top and 2nd piston ring  
Oversize top and middle ring sizes are stamped on top of ring.

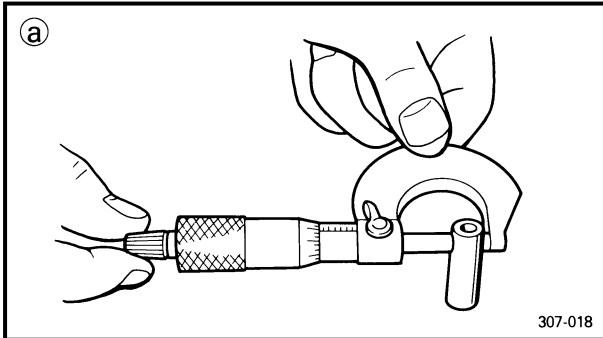
Oversize 2	0.50 mm (0.0197 in)
Oversize 4	1.00 mm (0.0394 in)





- Oil control ring  
Expander spacer of bottom ring (oil control ring) is color-coded to identify sizes.

Size	Color
Oversize 2	Blue
Oversize 4	Yellow



307-018

### Piston pin

#### 1. Inspect:

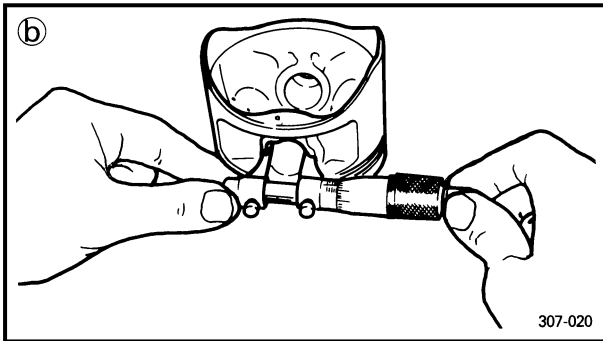
- Piston pin  
Blue discoloration/Grooves → Replace then inspect lubrication system.

#### 2. Measure:

- Outside diameter ① (piston pin)  
Out of specification → Replace.



**Outside diameter (piston pin):**  
15.991 ~ 16.000 mm  
(0.6296 ~ 0.6299 in)



307-020

#### 3. Measure:

- Piston pin bore inside diameter ② (piston)  
Out of specification → Replace.



**Piston pin bore inside diameter (piston):**  
16.002 ~ 16.013 mm  
(0.63 ~ 0.6304 in)

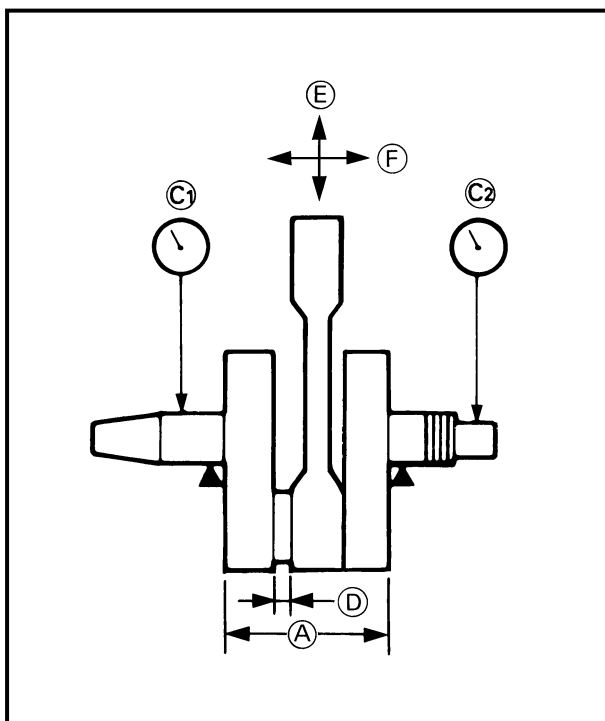
#### 4. Measure:

- Piston pin-to-piston clearance  
Out of specification → Replace piston.

**Piston pin-to-piston clearance =**  
**Bore size (piston) ② –**  
**Outside diameter (piston pin) ①**



**Piston pin-to-piston clearance:**  
0.002 ~ 0.022 mm  
(0.0001 ~ 0.0009 in)  
<Limit> 0.07 mm (0.003 in)

**CRANKSHAFT****1.Measure:**

- Crank width (A)  
Out of specification → Replace or repair.



**Crank width:**  
55.95 ~ 56.00 mm  
(2.203 ~ 2.205 in)

- Runout (C)  
Out of specification → Replace or repair.



**<Runout limit>:**  
C<sub>1</sub>: 0.03 mm (0.0012 in)  
C<sub>2</sub>: 0.06 mm (0.0024 in)

- Side clearance (D)  
Out of specification → Replace or repair.



**Big end side clearance:**  
0.35 ~ 0.65 mm (0.014 ~ 0.026 in)

- Big end radial clearance (E)  
Out of specification → Replace or repair.

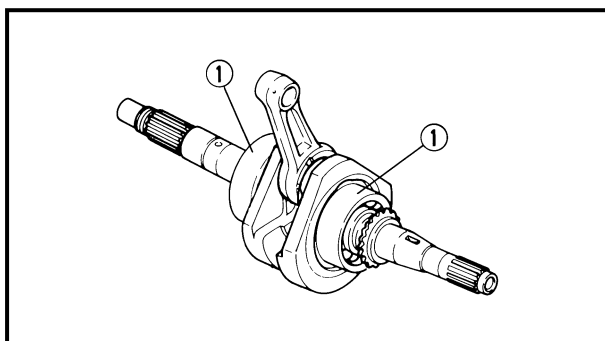


**Big end radial clearance:**  
0.010 ~ 0.025 mm  
(0.0004 ~ 0.0010 in)

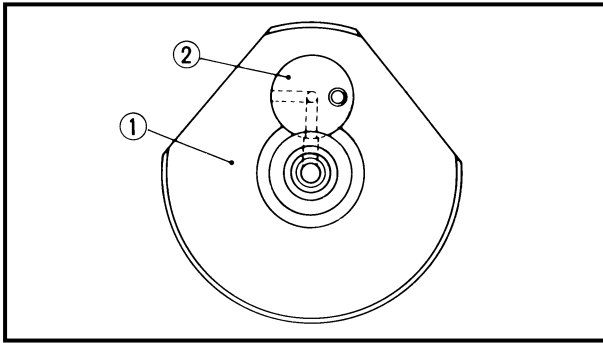
- Small end free play (F)  
Out of specification → Replace or repair.



**Small end free play:**  
0.8 ~ 1.0 mm (0.032 ~ 0.040 in)  
**< Limit>:**  
2.0 mm (0.08 in)

**2.Inspect:**

- Crankshaft bearings (1)  
Abnormal noise/Turn roughly/Free play → Replace.

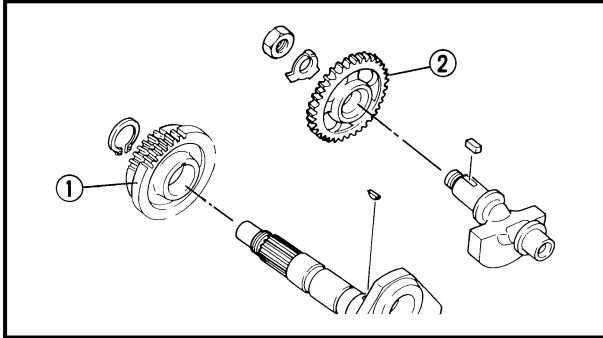


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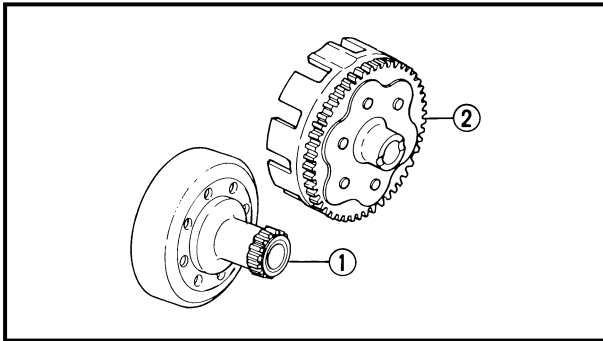
**Crankshaft reassembling point:**

The crankshaft ① and the crank pin ② oil passages must be properly interconnected with a tolerance of less than 1 mm (0.04 in).

\*\*\*\*\*

**BALANCER DRIVE GEAR AND DRIVEN GEARS****1.Inspect:**

- Balancer drive gear teeth ①
  - Balancer driven gear teeth ②
- Wear/Damage → Replace both gears.

**PRIMARY GEARS AND STARTER****1.Inspect:**

- Drive gear ①
  - Driven gear ②
- Scratches/Wear/Damage → Replace.  
Excessive noises during operation → Replace both gears.

**2.Inspect:**

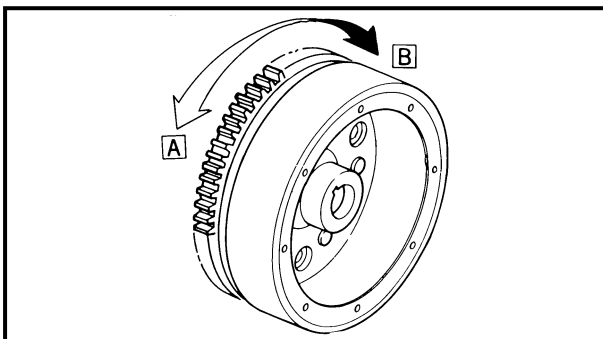
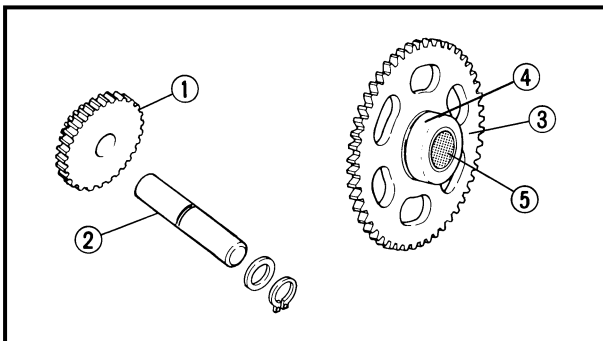
- Idler gear ① (starter)
  - Idler gear shaft ②
- Scratches/Wear/Damage → Replace.
- Driven gear ③ (starter)
  - Roller contact surface ④
  - Bearing ⑤ (driven gear)
- Scratch/Wear/Damage → Replace starter driven gear assembly.

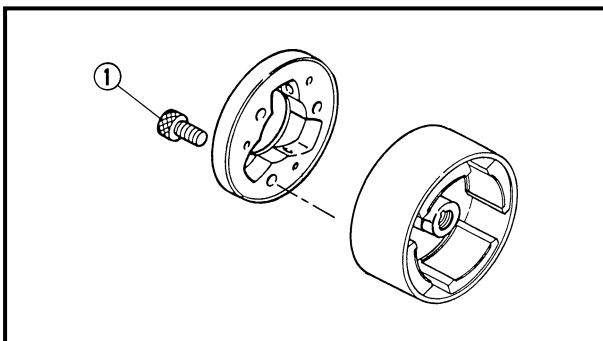
\*\*\*\*\*

**Starter clutch operation**

- Install the starter driven gear to the starter clutch, and hold the starter clutch.
- When turning the starter driven gear counter clockwise [A], the starter clutch and the driven gear should be engaged. If not, the starter clutch is faulty. Replace it.
- When turning the starter driven gear clockwise [B], the starter driven gear should turn freely. If not, the starter clutch is faulty. Replace it.

\*\*\*\*\*



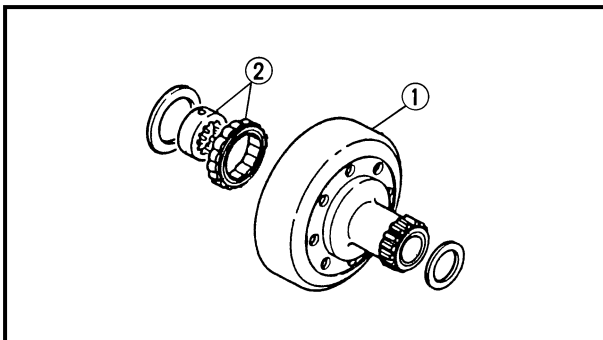
**3.Inspect:**

- Bolts ① (starter clutch)

Loose → Replace with a new one, and calk the end of the bolt.



**Bolts (starter clutch):**  
**30 Nm (3.0 m • kg, 22 ft • lb)**  
**LOCTITE®**  
**Calk the end of the bolt**

**PRIMARY CLUTCH****Clutch housing****1.Inspect:**

- Clutch housing ① (inner surface)  
Heat damage/Wear/Damage → Replace.
- Bearings ② (clutch housing)  
Chafing/Wear/Damage → Replace.

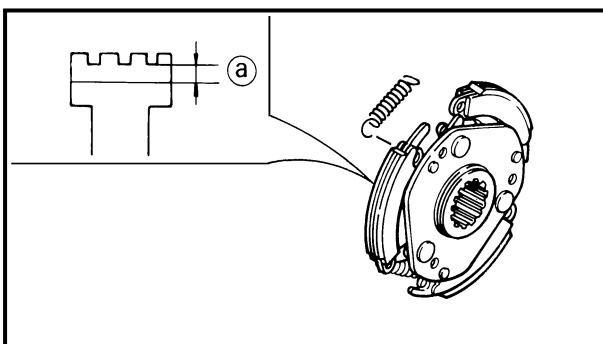
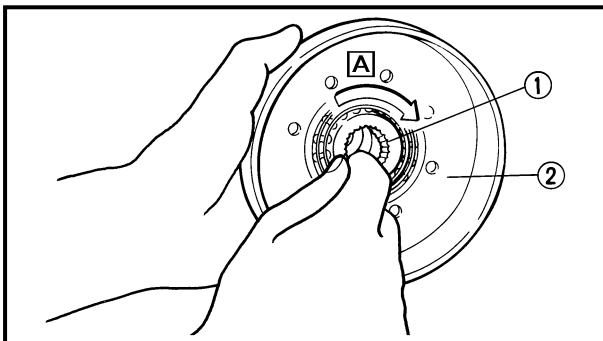
\*\*\*\*\*

**One way clutch operation**

Be sure that the splined inner collar ① turns clockwise **A**.

If the operation is not smooth or if it turns counterclockwise, replace the inner collar ① and primary clutch housing ② as a set.

\*\*\*\*\*

**Clutch carrier****1.Inspect:**

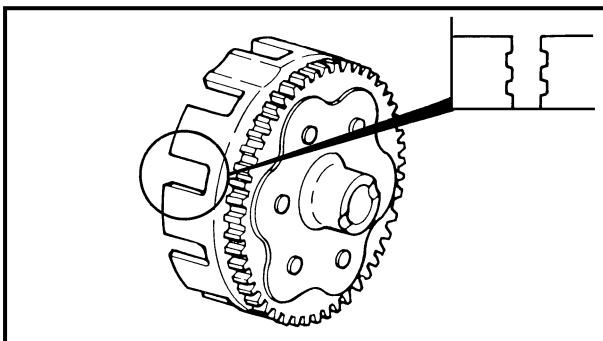
- Clutch shoe  
Heat damage → Replace.

**2.Measure:**

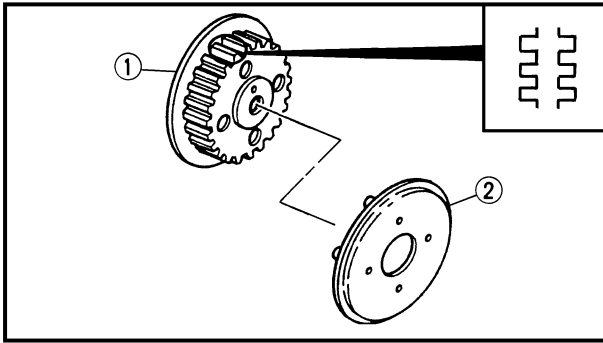
- Clutch shoe thickness  
Out of specification → Replace.



**Clutch shoe wear limit @:**  
**1.5 mm (0.06 in)**

**SECONDARY CLUTCH****Clutch housing****1.Inspect:**

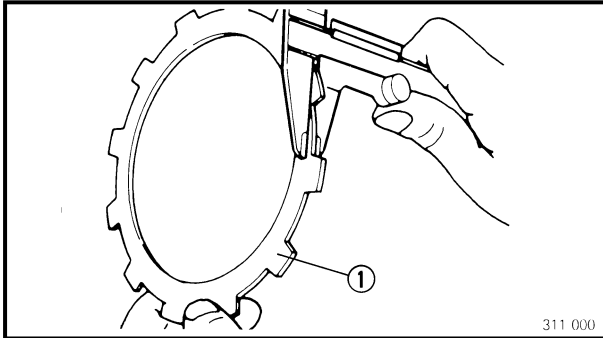
- Dogs on the housing  
Cranks/Wear/Damage → Deburr or replace.



### Clutch boss and pressure plate

#### 1. Inspect:

- Clutch boss splines ①
- Pressure plate splines ②  
Scoring/Wear/Damage → Replace clutch boss assembly and/or pressure plate.



### Friction plates

#### 1. Inspect:

- Friction plate ①  
Damage/Wear → Replace friction plate as a set.

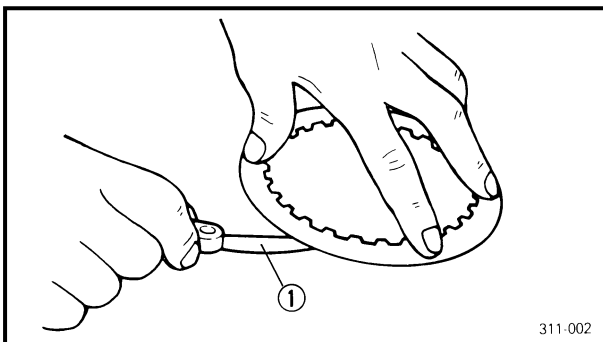
#### 2. Measure:

- Friction plate thickness  
Measure at all four points.  
Out of specification → Replace friction plate as a set.



**Wear limit:**  
**2.8 mm (0.110 in)**

**4**



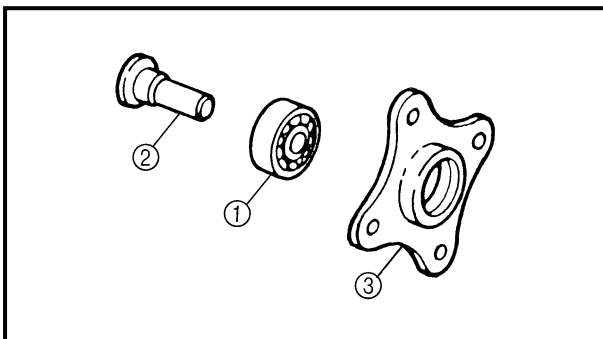
### Clutch plates

#### 1. Measure:

- Clutch plate warpage  
Use the surface plate and the Feeler Gauge ①.  
Out of specification → Replace.



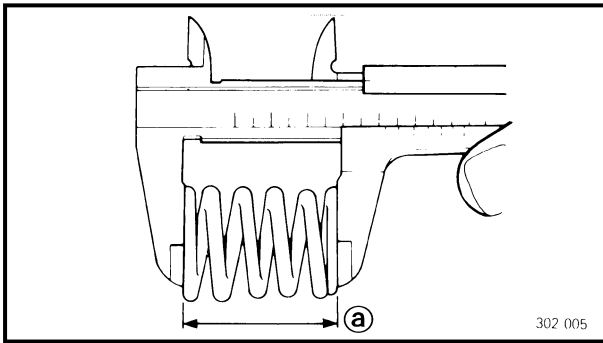
**Warp limit:**  
**0.2 mm (0.008 in)**



### Push rod and push rod bearing

#### 1. Inspect:

- Bearing ① (push rod)  
Roughness/Sluggishness → Replace.
- Push rod ②
- Bearing holder ③  
Wear/Damage → Replace.

**Clutch spring****1.Inspect:**

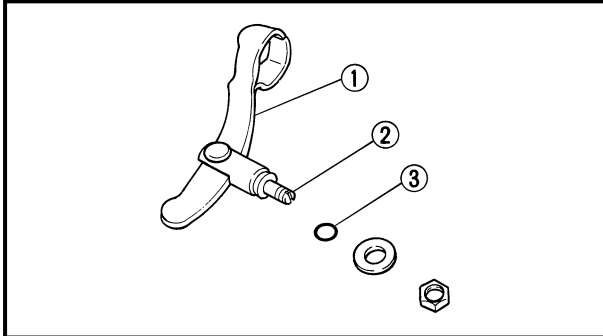
- Clutch spring  
Wear/Damage → Replace.

**2.Measure:**

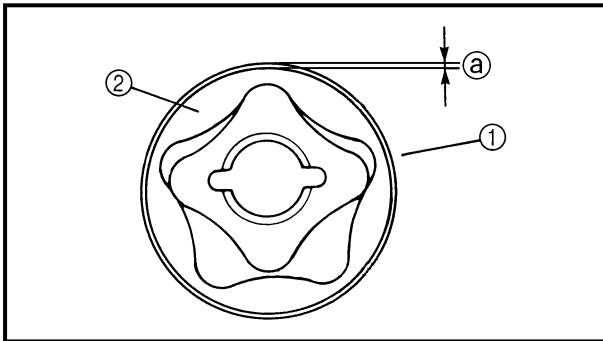
- Clutch spring free length @  
Out of specification → Replace springs as a set.



**Clutch spring minimum length:**  
**32.9 mm (1.30 in)**

**Clutch release lever****1.Inspect:**

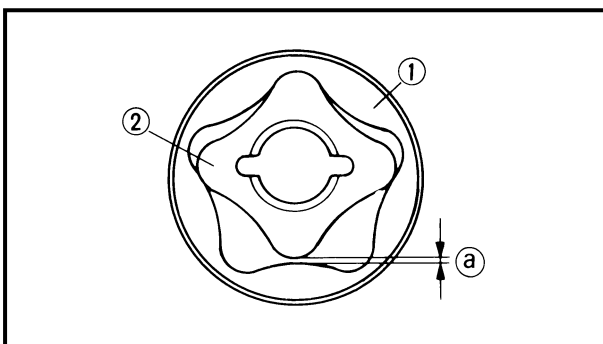
- Release lever ①
- Adjuster ②
- O-ring ③  
Cracks/Wear/Damage → Replace.

**OIL PUMP****1.Measure:**

- Housing ① /Outer rotor ② clearance @  
Use a Feeler Gauge.  
Out of specification → Replace oil pump assembly.



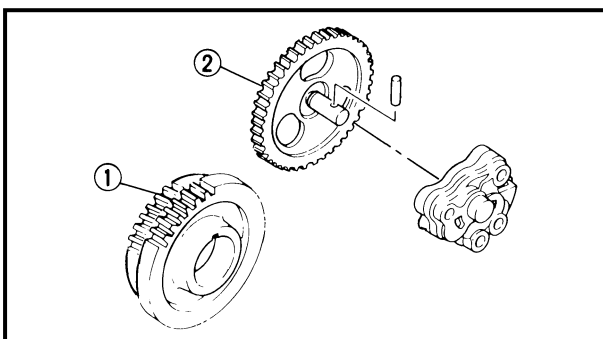
**Side clearance limit:**  
**0.09 mm (0.004 in)**

**2.Measure:**

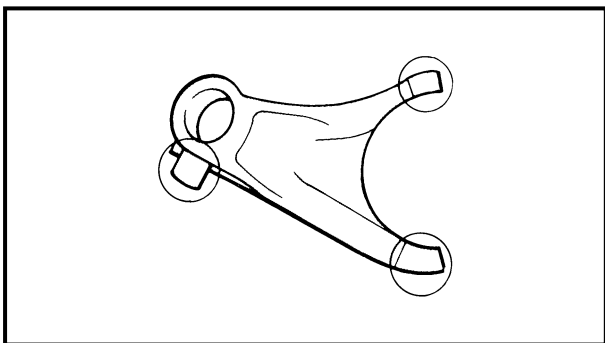
- Outer rotor ① /Inner rotor ② clearance @  
Use a Feeler Gauge.  
Out of specification → Replace oil pump assembly.



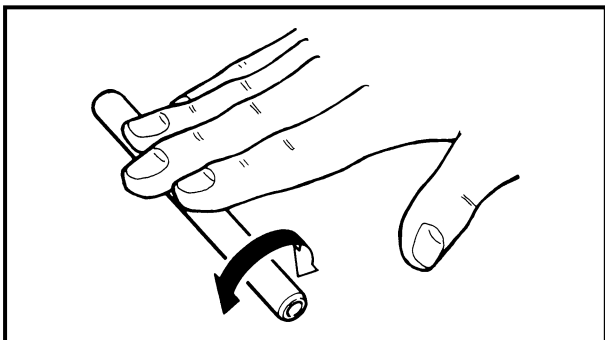
**Tip clearance limit:**  
**0.20 mm (0.008 in)**

**3.Inspect:**

- Oil pump drive gear ①
- Oil pump driven gear ②  
Wear/Cracks/Damage → Replace.

**TRANSMISSION AND SHIFTER****Shift fork and guide bar****1.Inspect:**

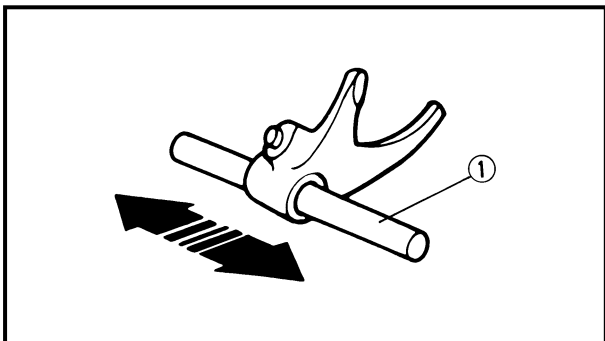
- Shift forks  
On the gear and shift cam contact surfaces.  
Wear/Chafing/Bends/Damage → Replace.

**2.Inspect:**

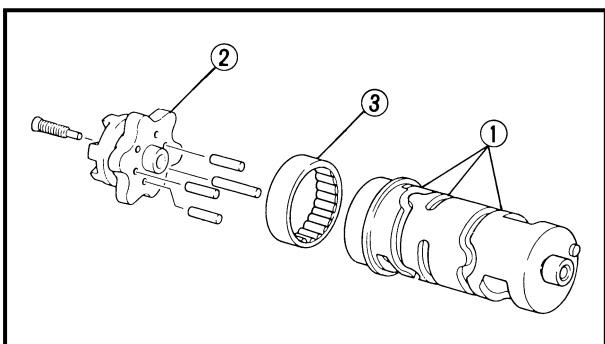
- Guide bars  
(Roll the guide bar on a flat surface.  
Bends → Replace.

**⚠ WARNING**

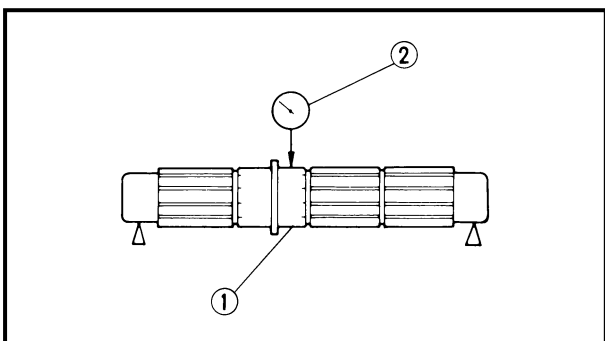
**Do not attempt to straighten a bent guide bar.**

**3.Check:**

- Shift fork movement  
On its guide bar ①.  
Unsmooth operation → Replace fork and/or guide bar.

**4****Shift cam****1.Inspect:**

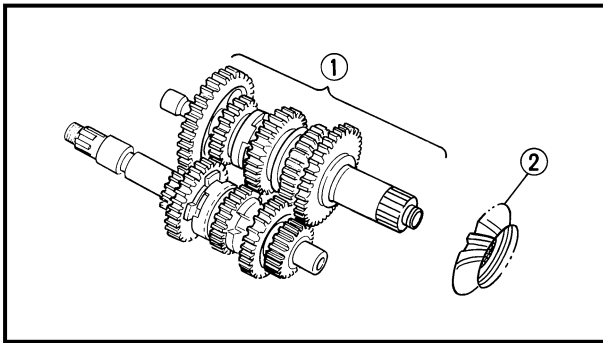
- Shift cam grooves ①  
Wear/Damage/Scratches → Replace.
- Shift cam segment ②  
Damage/Wear → Replace.
- Shift cam bearing ③  
Roughness/Sluggishness → Replace.

**Main/drive axle and gears****1.Measure:**

- Axle runout ① (main and drive axles)  
Use centering device and Dial Gauge ②.  
Out of specification → Replace.



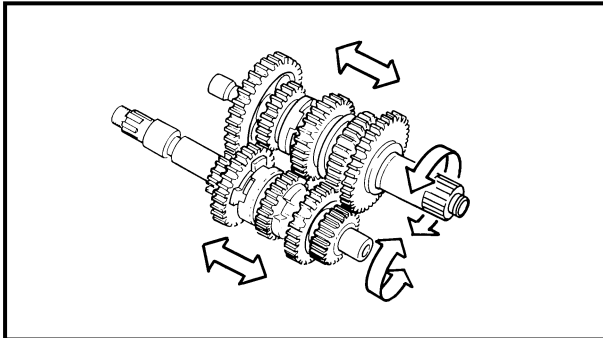
**Runout Limit:**  
**0.08 mm (0.0031 in)**

**2.Inspect:**

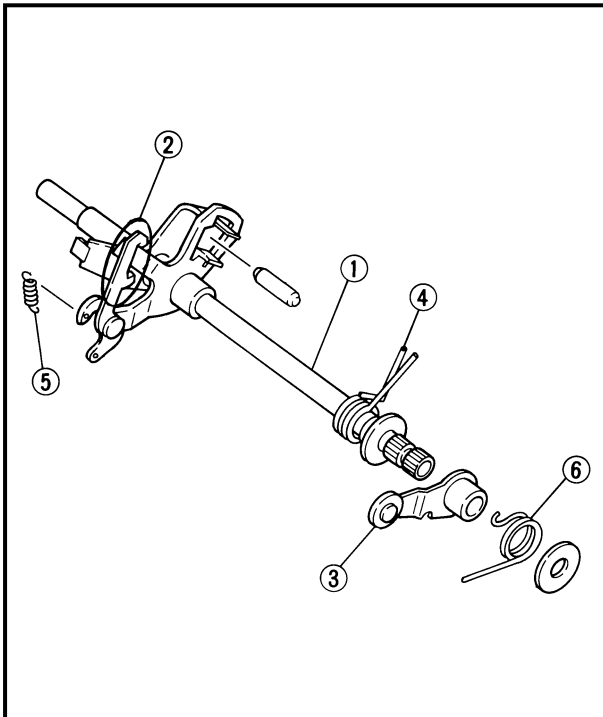
- Gears (transmission ① and drive pinion ②)
- Mating dogs  
Cracks/Damage/Wear → Replace.

**NOTE:**

When the drive pinion gear is replaced, be sure to adjust the drive pinion gear shim(s), refer to the "DRIVE TRAIN-MIDDLE GEAR SERVICE" section in CHAPTER 6.

**3.Check:**

- Gear movement (transmission)  
Unsmooth operation → Replace.

**Shift shaft and stopper lever****1.Inspect:**

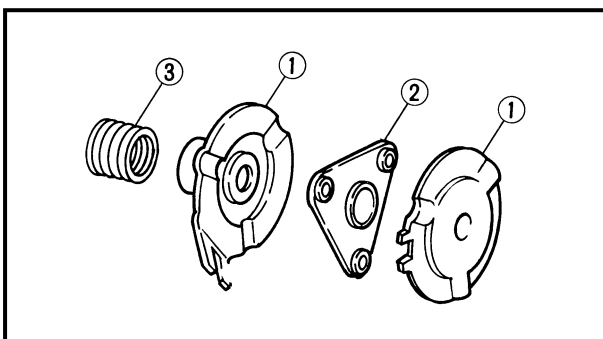
- Shift shaft ①
- Shift pawls ②  
Bend/Wear/Damage → Replace.

**2.Inspect:**

- Stopper lever ③  
Roller turns roughly → Replace.  
Bend/Damage → Replace.

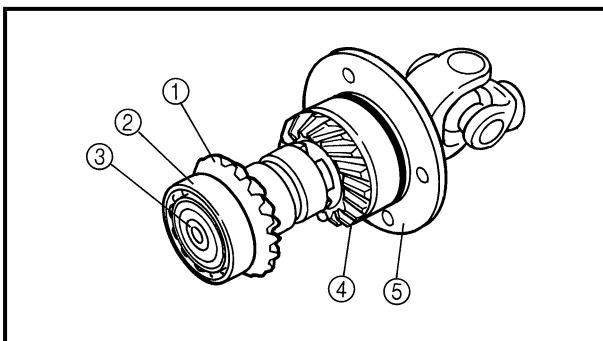
**3.Inspect:**

- Torsion spring ④ (shift shaft)
- Spring ⑤ (shift pawls)
- Return spring ⑥ (stopper lever)  
Wear/Damage → Replace.

**Shift guide****1.Inspect:**

- Shift guides ①
- Ball holder/Ball ②
- Spring ③  
Wear/Cranks/Damage → Replace.



**MIDDLE GEAR****1. Inspect:**

- Middle driven pinion gear ①
  - Bearing ②
  - Middle driven shaft ③
  - Reverse gear ④
  - Bearing housing ⑤
- Damage/Wear → Replace.

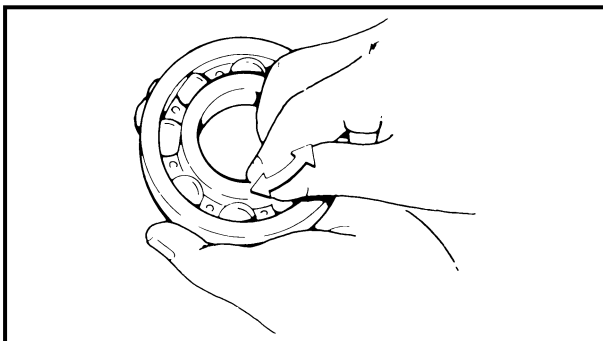
**2. Check:**

- Bearing movement
- Turns roughly → Replace.

**NOTE:**

When the driven pinion gear, reverse gear, middle driven shaft and/or bearing housing are replaced, be sure to adjust the middle gear shim(s).

Refer to the "DRIVE TRAIN-MIDDLE GEAR SERVICE" section in CHAPTER 6.

**BEARINGS AND OIL SEALS****1. Inspect:**

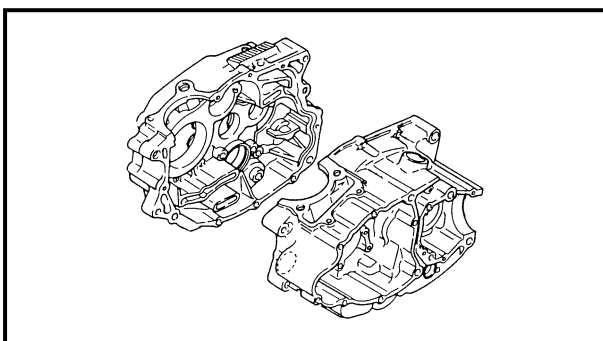
- Bearings
- Pitting/Damage → Replace.

**2. Inspect:**

- Oil seals
- Damage/Wear → Replace.

**CIRCLIPS AND WASHERS****1. Inspect:**

- Circlips
  - Washers
- Damage/Looseness/Bends → Replace.

**CRANKCASE**

1. Thoroughly wash the case halves in mild solvent.
2. Clean all the gasket mating surfaces and crankcase mating surfaces thoroughly.



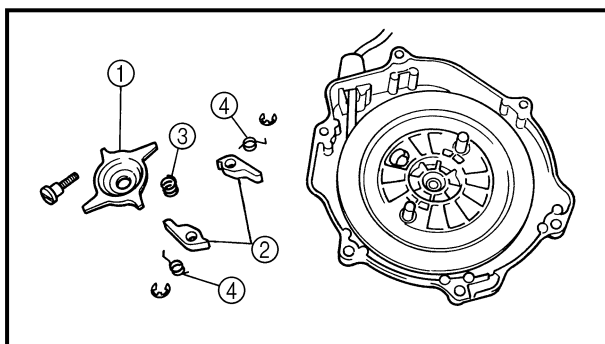
## 3. Inspect:

- Crankcase  
Cracks/Damage → Replace.
- Oil delivery passages  
Clog → Blow out with compressed air.

**NOTE:**

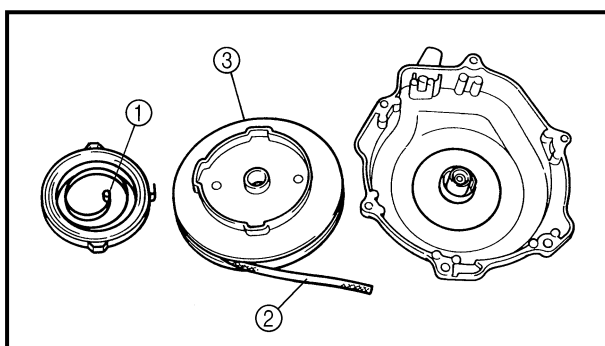
When the crankcase is replaced, be sure to adjust the middle gear shim(s), refer to "DRIVE TRAIN-MIDDLE GEAR SERVICE" section in CHAPTER 6.

## 4

**RECOIL STARTER**

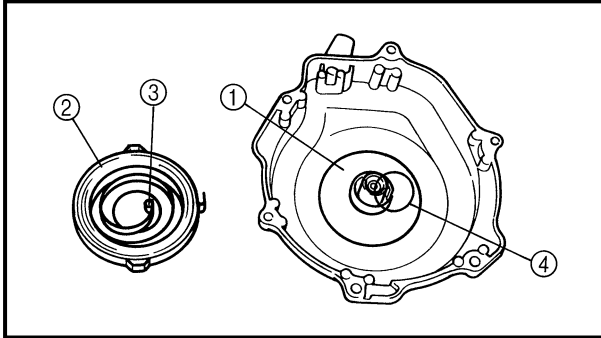
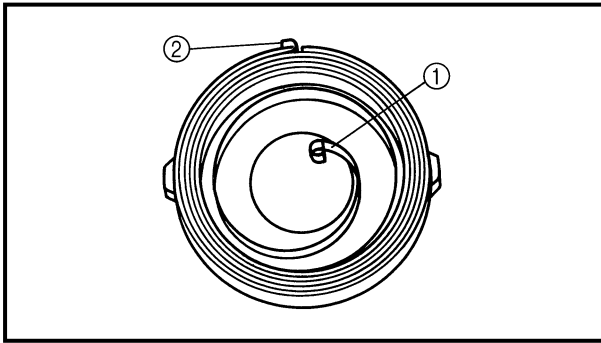
## 1. Inspect:

- Drive plate ①  
Cracks Bends/Damage → Replace.
- Drive pawl ②
- Spring ③
- Spring ④ (drive pawl)  
Wear/Cracks/Damage → Replace.



## 2. Inspect:

- Spring ① (starter)  
Wear/Cracks/Damage → Replace.
- Starter rope ②  
Wear/Breaks/Damage → Replace.
- Sheave drum ③  
Cracks/Damage → Replace.



## ENGINE ASSEMBLY AND ADJUSTMENT

### RECOIL STARTER

1.Install:

- Starter spring ①

#### NOTE:

Mesh the spring hook ② wise the case slit, then carefully wind the spring counterclockwise, and fit the spring into the case.

2.Install:

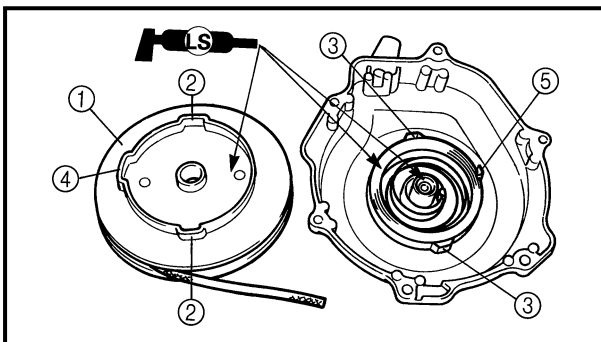
- Plate ①
- Starter spring case ②

#### NOTE:

Mesh the end ③ of the sheave spring with spring hook ④ on the recoil starter cover.

3.Wind the rope 4-1/2 turns clockwise around the sheave drum, and set the rope onto the drum slit.

4



4.Lubricate:

- Starter spring
- Sheave drum



Lithium-soap base grease

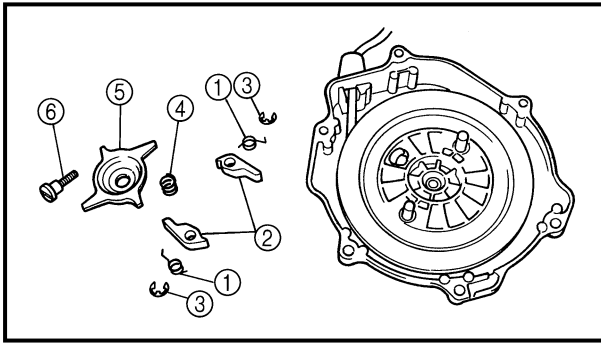
5.Install:

- Sheave drum ①

#### NOTE:

Make sure the two slots ② are meshed into the two projections ③ respectively.

Also, make sure slot ④ properly fits over the spring end ⑤.

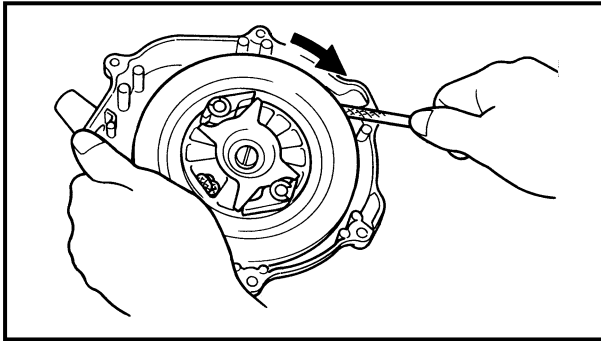
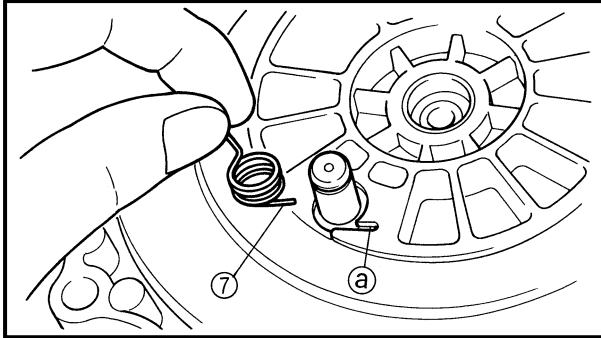


### 6.Install:

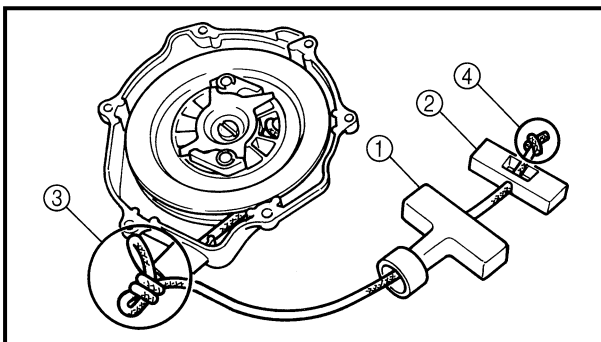
- Spring (drive pawl) ①
- Drive pawl ②
- Circlip ③
- Spring ④
- Drive plate ⑤
- Bolt ⑥

### NOTE:

When installing the spring (drive pawl), align the spring end ⑦ with the groove ⑧ on the sheave drum.



7.Turn the sheave drum 3-turns clockwise to preload the starter spring.



### 8.Install:

- Starter handle ①
- Cap ②

### NOTE:

- Pass the rope through the case hole and make knot ③ on the rope so that the rope is not pulled into the case.
- Untying knot ③ after making knot ④.

- ① Balancer driven gear
- ② Bearing
- ③ Straight key
- ④ Balancer
- ⑤ Oil seal
- ⑥ Balancer drive gear
- ⑦ Woodruff key
- ⑧ Crank (right)
- ⑨ Connecting rod
- ⑩ Small end bearing
- ⑪ Crank pin
- ⑫ Crank (left)

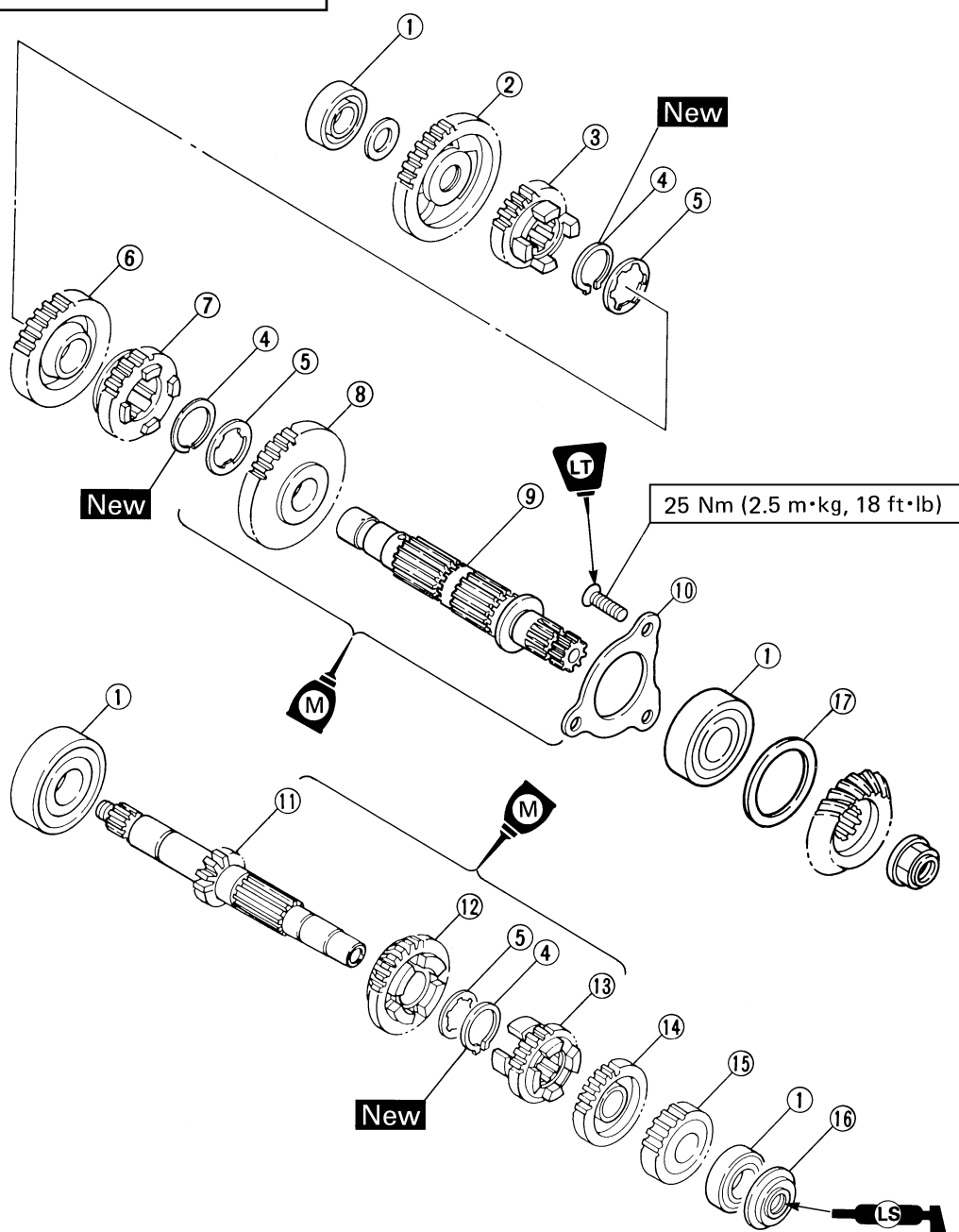




### TRANSMISSION

- |                  |                    |                   |
|------------------|--------------------|-------------------|
| ① Bearing        | ⑧ 2nd wheel gear   | ⑮ 2nd pinion gear |
| ② 1st wheel gear | ⑨ Drive axle       | ⑯ Oil seal        |
| ③ 5th wheel gear | ⑩ Bearing retainer | ⑰ Shim            |
| ④ Circlip        | ⑪ Main axle        |                   |
| ⑤ Washer         | ⑫ 5th pinion gear  |                   |
| ⑥ 3rd wheel gear | ⑬ 3rd pinion gear  |                   |
| ⑦ 4th wheel gear | ⑭ 4th pinion gear  |                   |

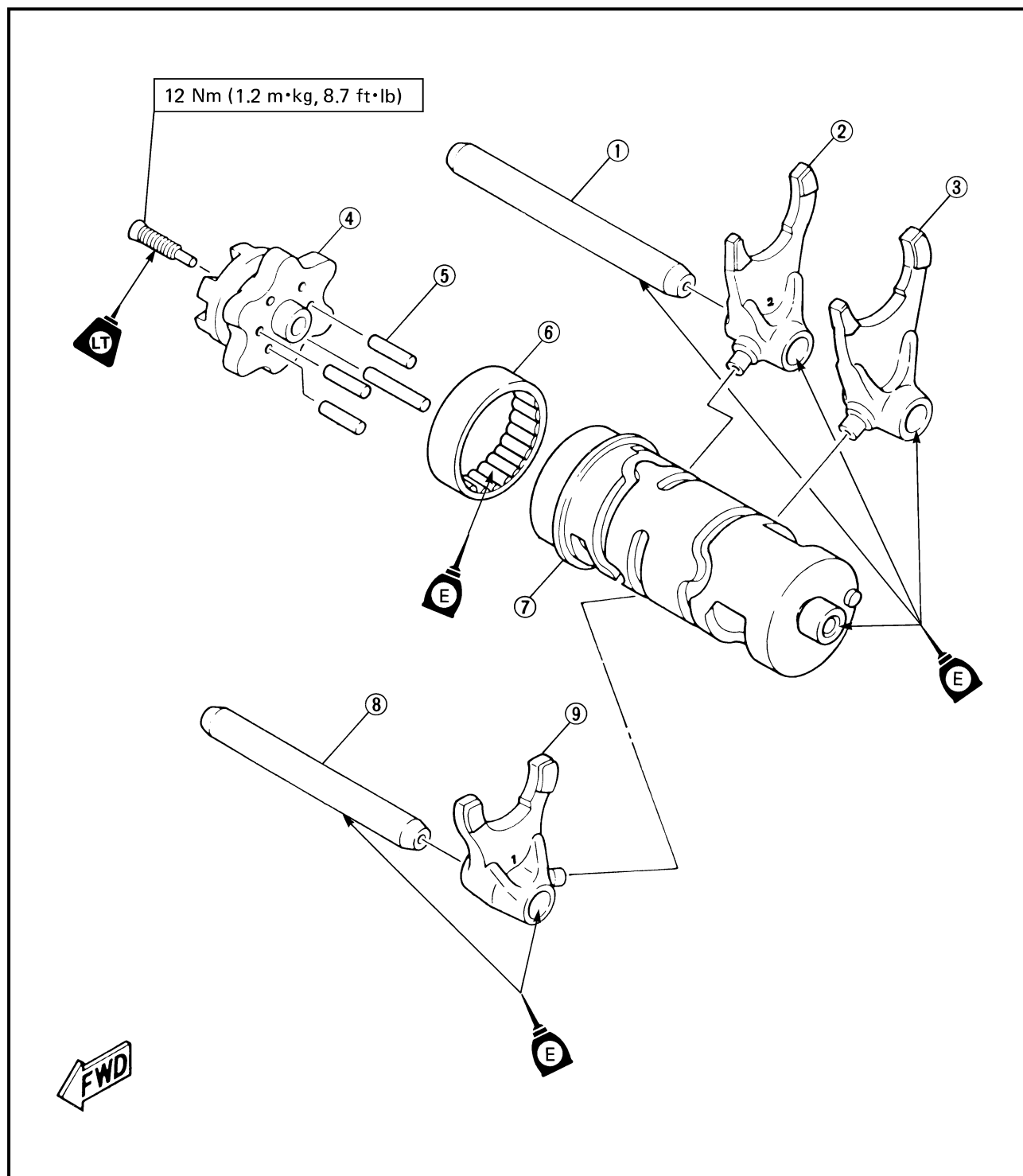
A DRIVE/MAIN AXLE RUNOUT:  
<Limit>  
0.08 mm (0.003 in)



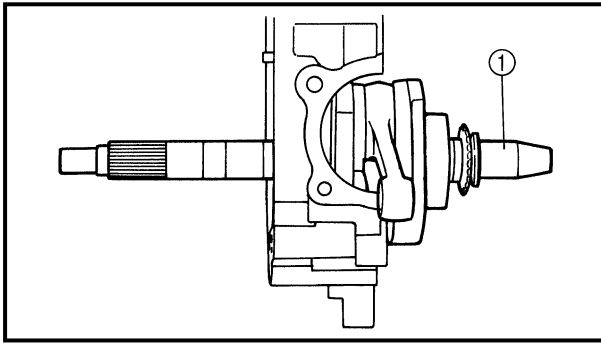


### SHIFTER

- ① Guide bar #1 (long)
- ② Shift fork #2
- ③ Shift fork #3
- ④ Shift cam segment
- ⑤ Pin
- ⑥ Bearing
- ⑦ Shift cam
- ⑧ Guide bar #2 (short)
- ⑨ Shift fork #1



4



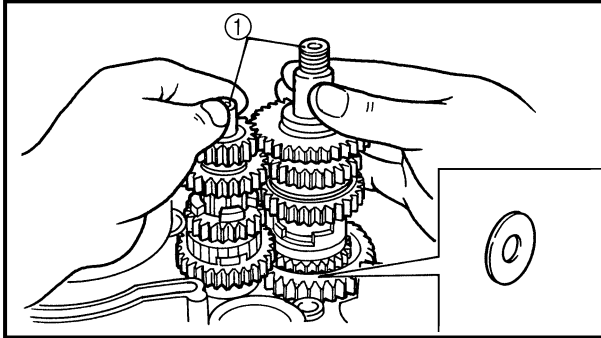
### CRANKSHAFT, TRANSMISSION AND BALANCER SHAFT

1.Install:

- Crankshaft ①  
(to right crankcase)

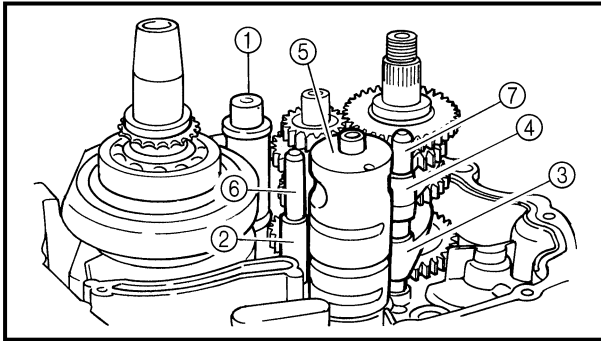
**NOTE:**

Hold the connecting rod at top dead center with one hand while installing the crankshaft.



2.Install:

- Transmission assembly ① (main axle and drive axle)

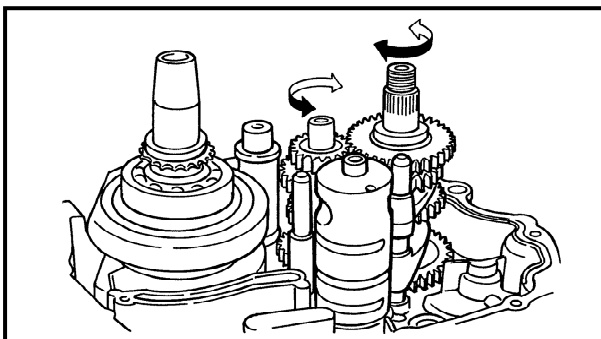


3.Install:

- Balancer shaft ①
- Shift fork #1 ②
- Shift fork #2 ③
- Shift fork #3 ④
- Shift cam ⑤
- Guide bar #2 ⑥ (short)
- Guide bar #1 ⑦ (long)

**NOTE:**

Each shift fork is identified by a number cast on its side.



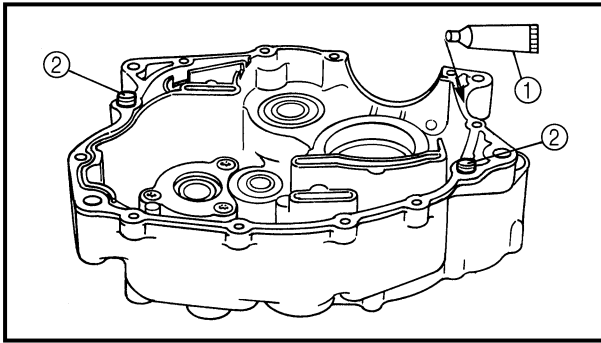
4.Check:

- Transmission and shifter operation  
Unsmooth operation → Repair.

**NOTE:**

- Oil each gear and bearing thoroughly.
- Before assembling the crankcase, be sure that the transmission is in neutral and that the gears turn freely.





## CRANKCASE (LEFT)

1. Apply:

- Sealant ①  
(to matching surfaces of both case halves)



**Sealant (Quick Gasket®):**  
**ACC-QUICK-GS-KT**  
**Yamaha bond No. 1215:**  
**90890-85505**

2. Install:

- Dowel pins ②

3. Fit the left crankcase onto the right case.

Tap lightly on the case with a soft hammer.

## CAUTION:

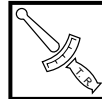
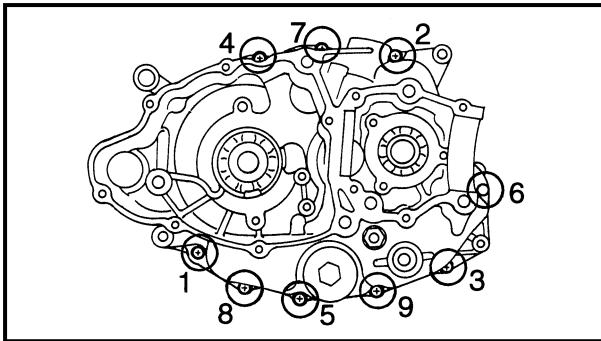
Before installing and torquing the crankcase holding screws, be sure to check whether the transmission is functioning properly by manually rotating the shift cam either way.

4. Tighten:

- Screws (crankcase)

## NOTE:

Tighten the screw starting with the lowest numbered one.



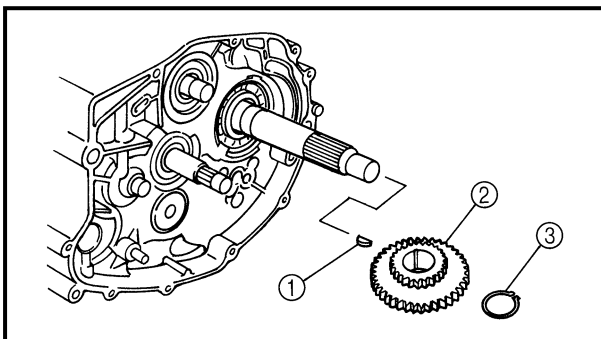
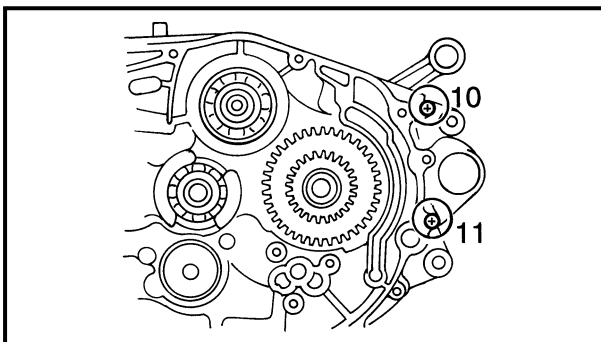
**Screws (crankcase):**  
**7 Nm (0.7 m • kg, 5.1 ft • lb)**

5. Apply:

- 4-stroke engine oil  
To the crank pin, bearing and oil delivery hole.

6. Check:

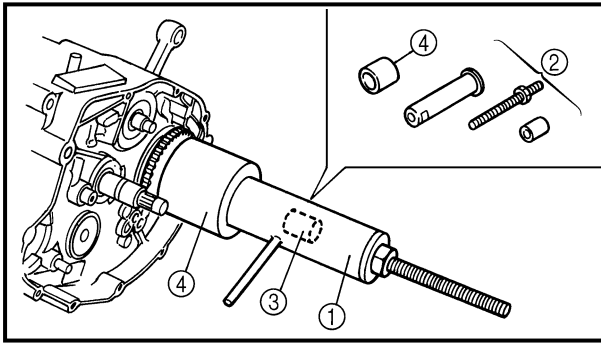
- Crankshaft and transmission operation  
Unsmooth operation → Repair.



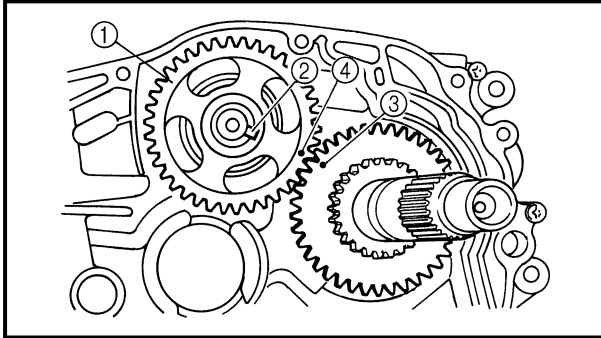
## BALANCER DRIVEN AND DRIVE GEARS

1. Install:

- Woodruff key ①
- Balancer gear ② (drive)
- Circlip ③



**Crankshaft installer set ①:**  
P/N. YU-90050  
**Buffer boss installer set ②:**  
P/N. 90890-04088  
**Adapter #11 ③:**  
P/N. YM-33279  
**Spacer ④ (crankshaft):**  
P/N. YM-90070-A, 90890-04060

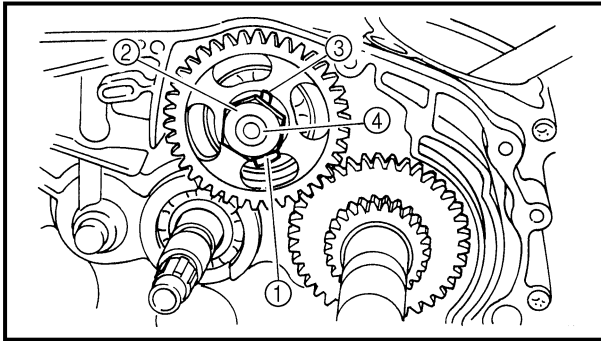


2.Install:

- Balancer gear ① (driven)
- Straight key ②

**NOTE:**

Align the drive gear mark ③ with the driven gear mark ④.



3.Install:

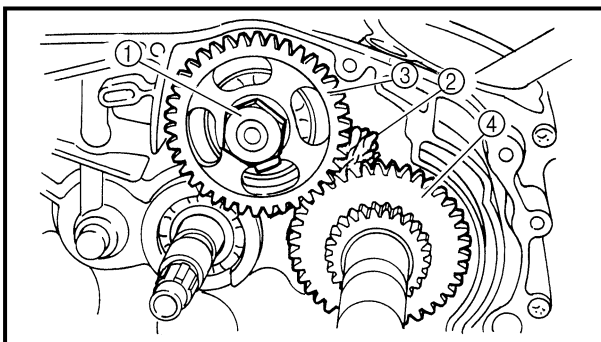
- Lock washer ①
- Nut ② (driven gear)

## ⚠ WARNING

Always use a new lock washer.

**NOTE:**

Install the lock washer tab ③ into the key way of the balancer shaft ④.



4.Tighten:

- Nut ① (driven gear)



**Nut (balancer driven gear):**  
50 Nm (5.0 m • kg, 36 ft • lb)

**NOTE:**

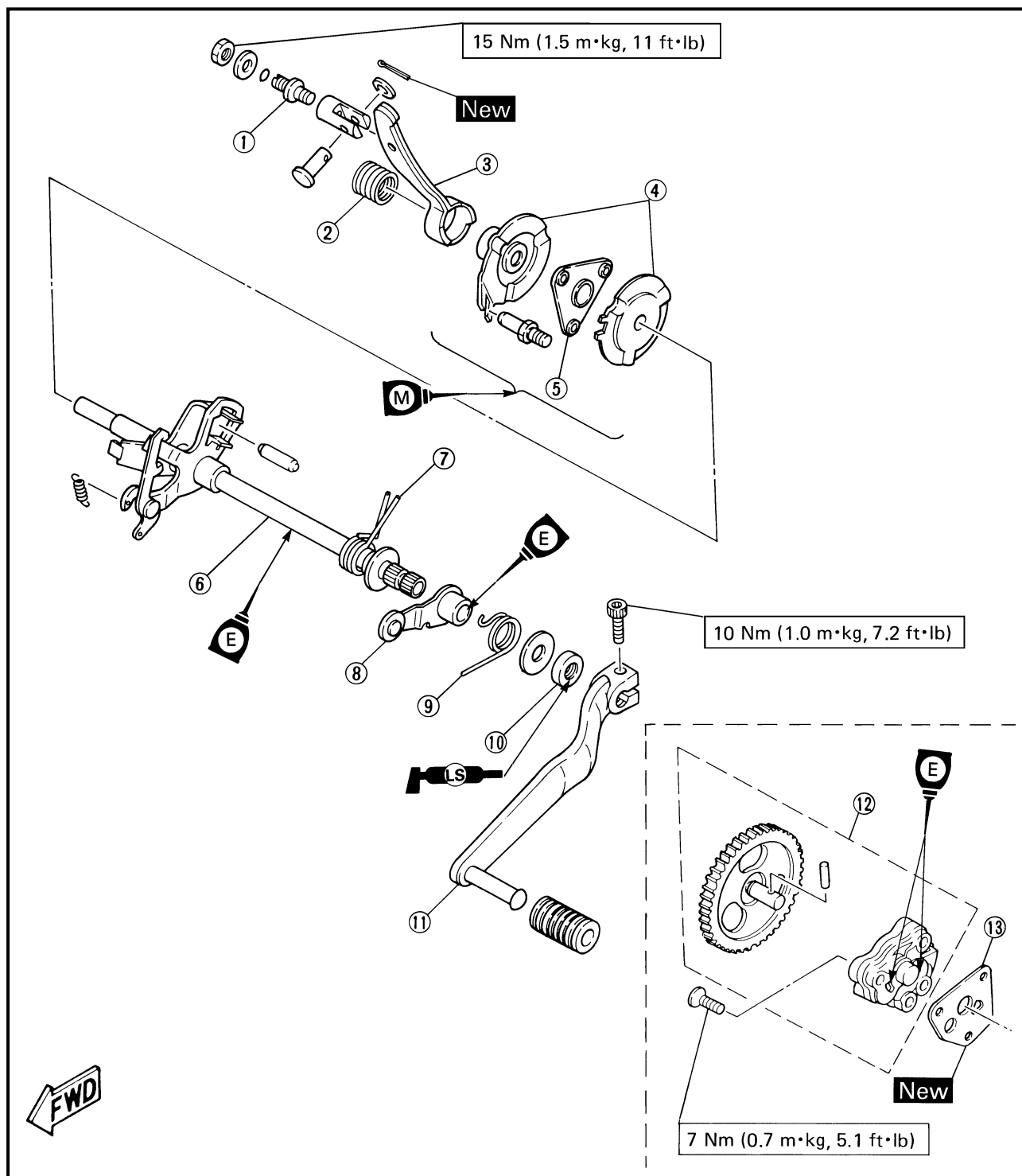
Place a folded rag ② between the teeth of the driven gear ③ and drive gear ④ to lock them.

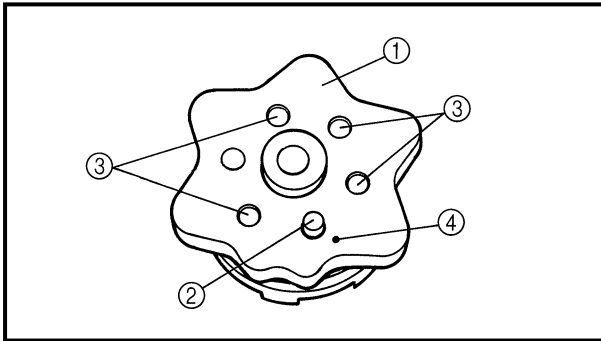
5.Bend the lock washer tab.



## SHIFT SHAFT/OIL PUMP

- |                  |                     |
|------------------|---------------------|
| ① Adjuster       | ⑧ Stopper lever     |
| ② Spring         | ⑨ Return spring     |
| ③ Release lever  | ⑩ Oil seal          |
| ④ Shift guides   | ⑪ Shift pedal       |
| ⑤ Ball holder    | ⑫ Oil pump assembly |
| ⑥ Shift shaft    | ⑬ Gasket            |
| ⑦ Torsion spring |                     |





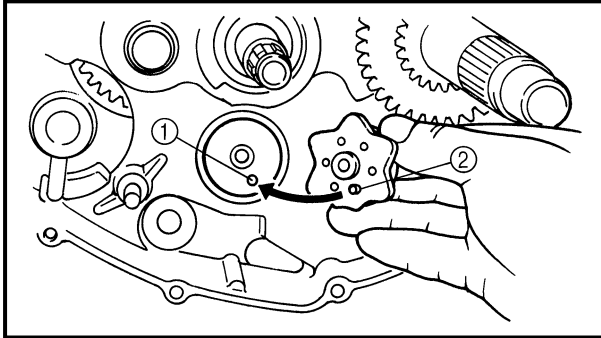
### SHIFTER AND OIL PUMP

1.Install:

- Segment ①
- Pin ② (long)
- Pin ③ (short)

**NOTE:**

Install the pin ② (long) to the match mark ④ position.

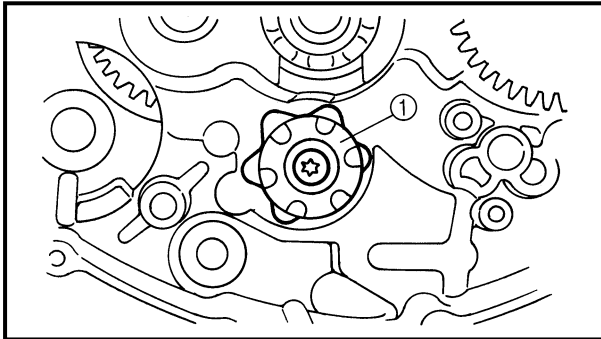


2.Install:

- Segment (shift cam)

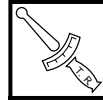
**NOTE:**

Align the hole ① of the shift cam with the pin ② (long) of the segment.



3.Tighten:

- Screw ① (segment)

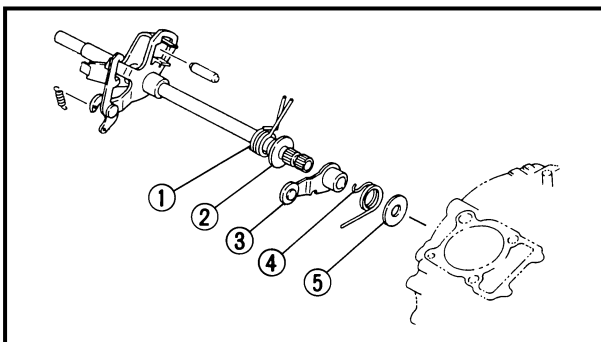


**Screw (segment):**

**12 Nm (1.2 m • kg, 8.7 ft • lb)**

**Use LOCTITE®**

4



4.Install:

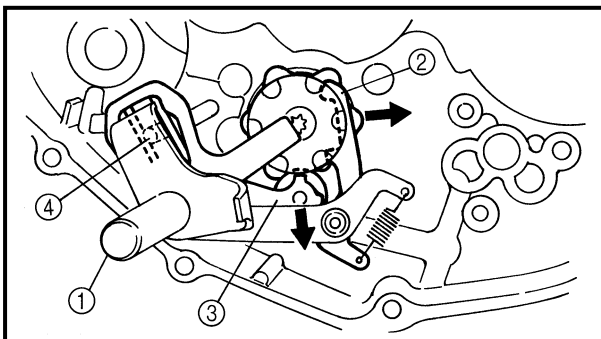
- Torsion spring ① (to shift shaft)
- Washer ②
- Stopper lever ③ with return spring ④
- Washer ⑤

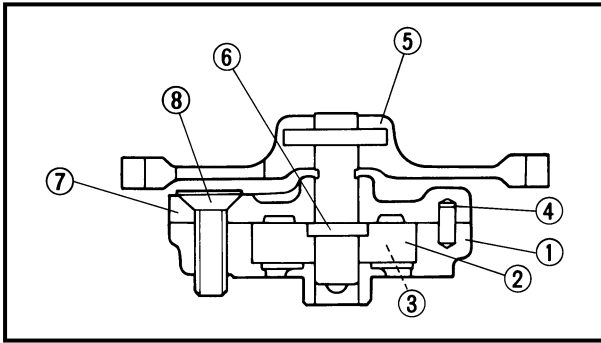
5.Install:

- Shift shaft ①

**NOTE:**

- Before installing the shift shaft, apply the grease to the oil seal lip (crankcase-left).
- Push the shift pawl ② and the stopper lever ③ to the arrow direction and install them to the segment.
- Be sure the stopper shaft ④ is placed between the spring hooks.





6. Apply:

- 4-stroke engine oil  
(to the oil pump inner parts)

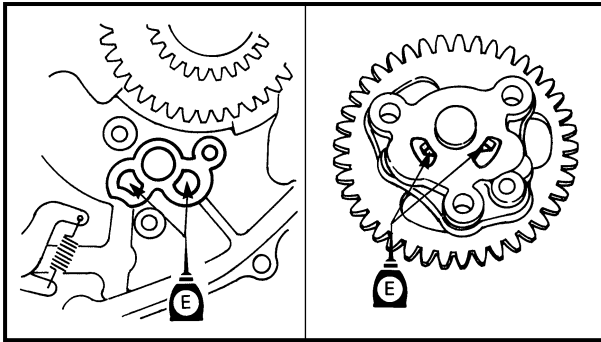
7. Install:

- Rotor housing ①
- Outer rotor ②
- Inner rotor ③
- Dowel pins ④
- Oil pump driven gear ⑤
- Dowel pin ⑥
- Oil pump cover ⑦
- Screw ⑧



**Screw:**

**7 Nm (0.7 m • kg, 5.1 ft • lb)**



8. Apply:

- 4-stroke engine oil  
(to the oil passages in the crankcase)

## CAUTION:

**Apply a liberal amount of 4-stroke engine oil to the oil pump passages in the crankcase, or the engine may be damaged.**

9. Apply:

- 4-stroke engine oil  
(to the oil passages in the oil pump)

10. Install:

- Gasket
- Oil pump assembly ①

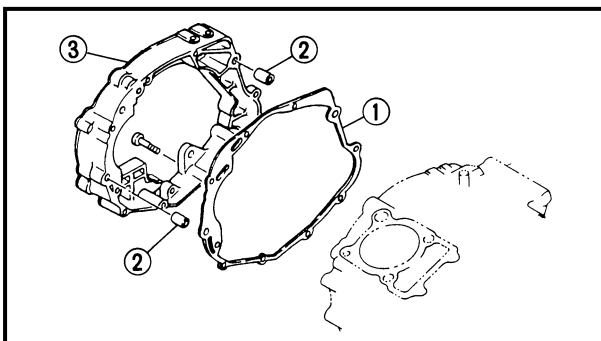
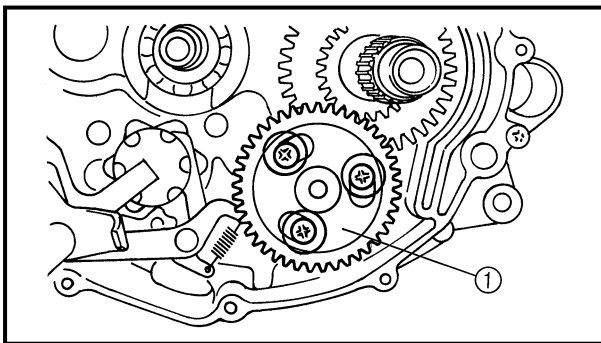


**Oil pump:**

**7 Nm (0.7 m • kg, 5.1 ft • lb)**

## ⚠ WARNING

**Always use a new gasket.**



11. Install:

- Gasket ① (new)
- Dowel pin ②
- Crankcase spacer ③ (right)



**Crankcase spacer (right):**

**7 Nm (0.7 m • kg, 5.1 ft • lb)**

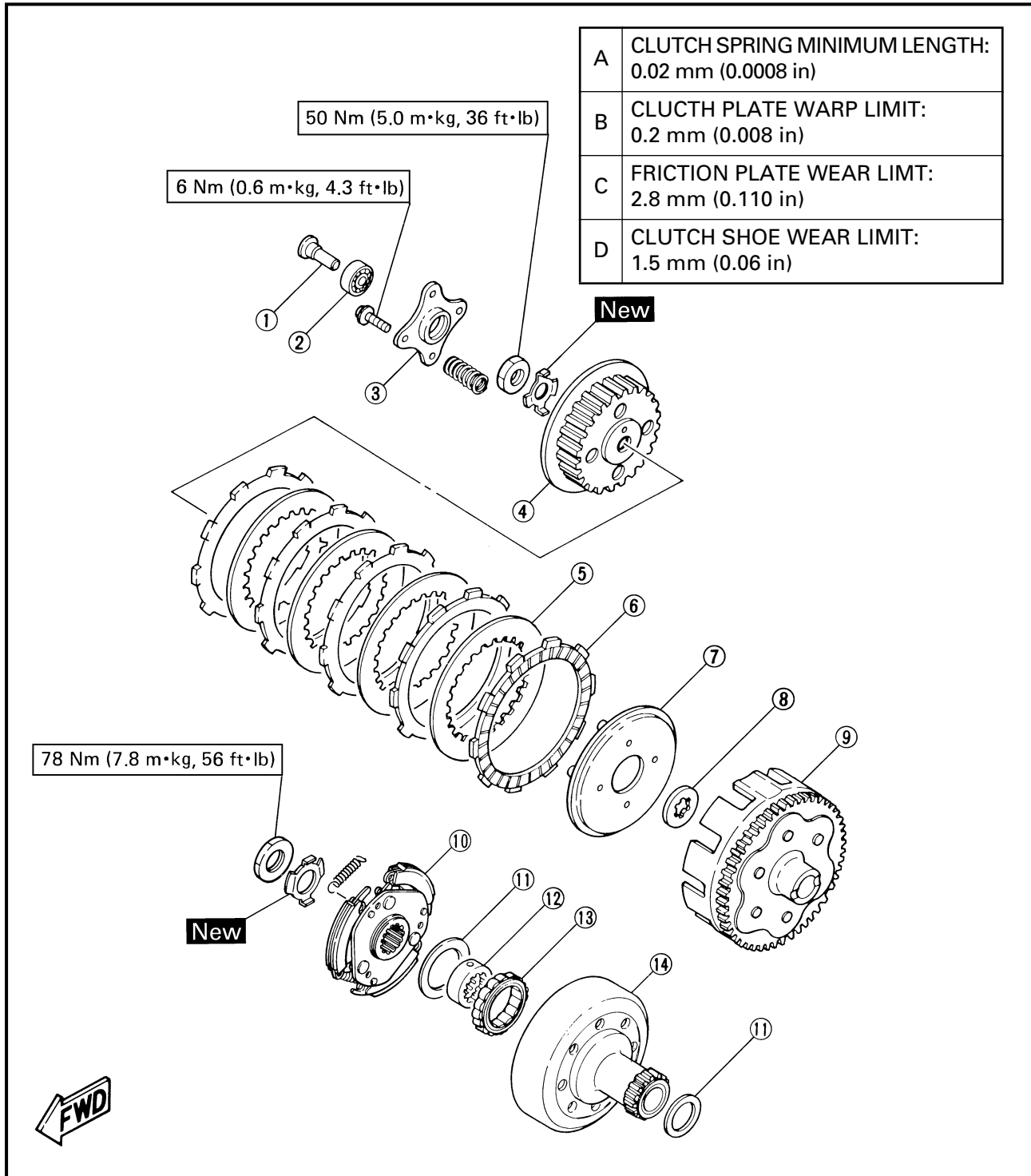
## ⚠ WARNING

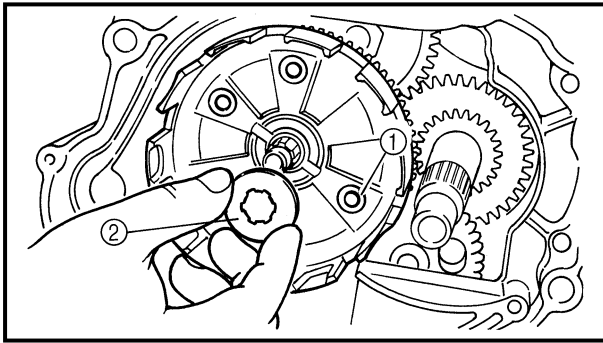
**Always use a new gasket.**



### CLUTCH

- |                  |                              |
|------------------|------------------------------|
| ① Push rod       | ⑧ Washer                     |
| ② Bearing        | ⑨ Clutch housing (secondary) |
| ③ Bearing holder | ⑩ Clutch carrier assembly    |
| ④ Clutch boss    | ⑪ Washer                     |
| ⑤ Clutch plate   | ⑫ Inner collar               |
| ⑥ Friction plate | ⑬ One way bearing            |
| ⑦ Pressure plate | ⑭ Clutch housing (primary)   |

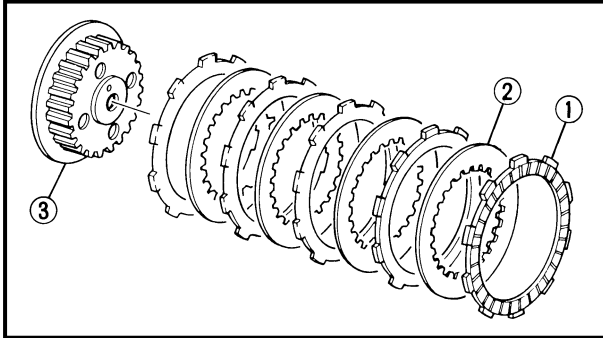




## PRIMARY AND SECONDARY CLUTCHES

1.Install:

- Clutch housing ① (secondary)
- Washer ②

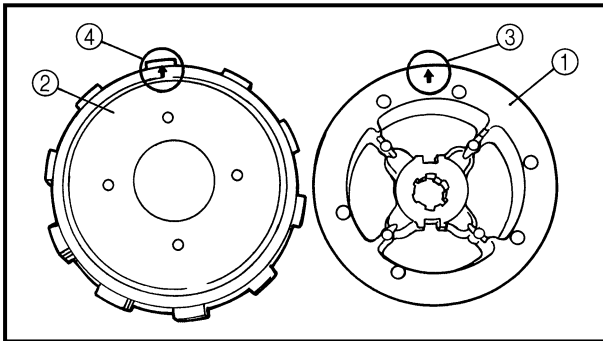


2.Install:

- Friction plates ①
- Clutch plates ②  
(to clutch boss ③)

### NOTE:

Install the clutch plates and friction plates alternately on the clutch boss, starting with a friction plate and ending with a friction plate.

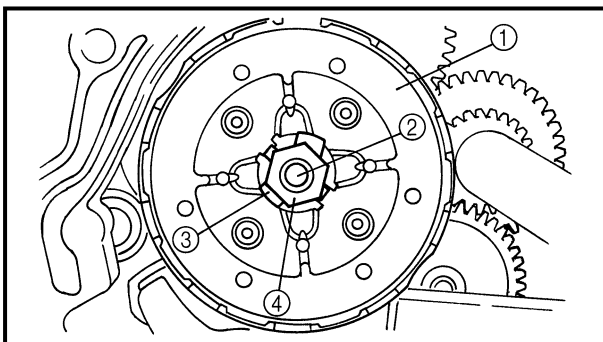


3.Install:

- Clutch boss ①
- (to pressure plate assembly ②)

### NOTE:

Align the arrow marks ③ on the clutch boss with the arrow mark ④ on the pressure plate.



4.Install:

- Secondary clutch assembly ①
- (to main axle ②)
- Lock washer ③
- Nut ④ (clutch boss)

### ⚠ WARNING

Always use a new lock washer.

### NOTE:

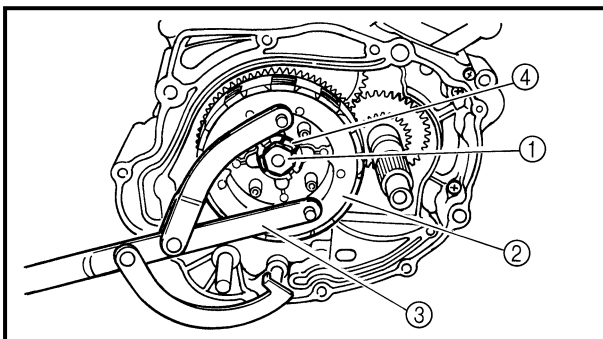
Make sure that the tabs of the lock washer engages the indentations in the clutch boss.

5.Tighten:

- Nut ① (clutch boss)



**Nut (clutch boss):**  
50 Nm (5.0 m • kg, 36 ft • lb)





### NOTE:

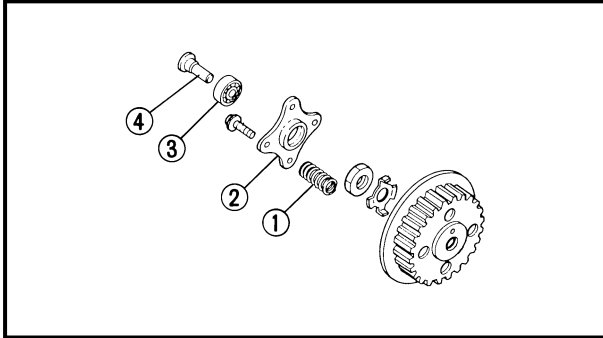
Hold the clutch boss ② by the Rotor Holder ③ to tighten the nut.



**Rotor holder:**

**P/N. YU-01235, 90890-01235**

6. Bend the lock washer tab ④.



7. Install:

- Clutch springs ①
- Bearing holder ②
- Bearing ③
- Push rod ④



**Bolts (clutch spring):**

**6 Nm (0.6 m • kg, 4.3 ft • lb)**

8. Install:

- Drive pinion gear ①
- Nut ② (drive pinion gear)

### ⚠ WARNING

**Always use a new drive pinion gear nut.**

9. Tighten:

- Nut ② (drive pinion gear)



**Nut (drive pinion gear):**

**60 Nm (6.0 m • kg, 43 ft • lb)**

### NOTE:

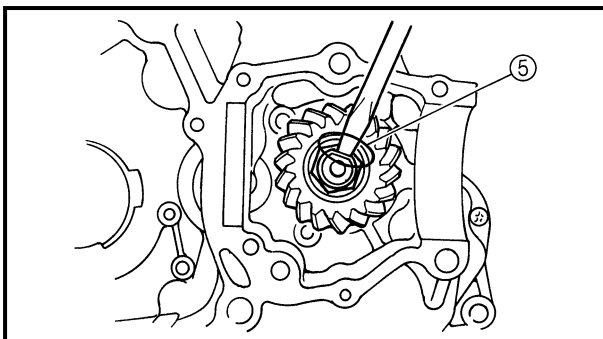
Hold the clutch boss ③ on the secondary clutch by the Rotor Holder ④ to tighten the nut.



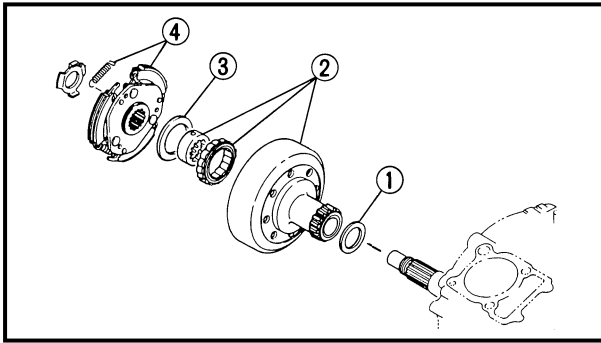
**Rotor holder:**

**P/N. YU-01235, 90890-01235**

10. Lock the threads ⑤ with drift punch.

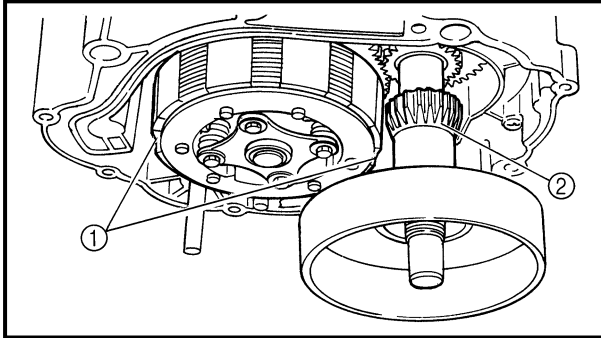






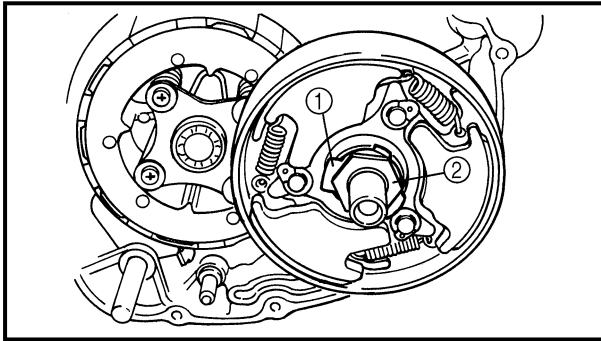
11.Install:

- Washer ①
- Clutch housing ② (primary)
- Washer ③
- Clutch carrier assembly ④



**NOTE:**

- The secondary clutch housing has two grooves ① machined into it permit the primary drive gear behind the primary clutch to clear the secondary clutch.
- Align one of these grooves with the primary gear ② before installing the primary clutch housing.



12.Install:

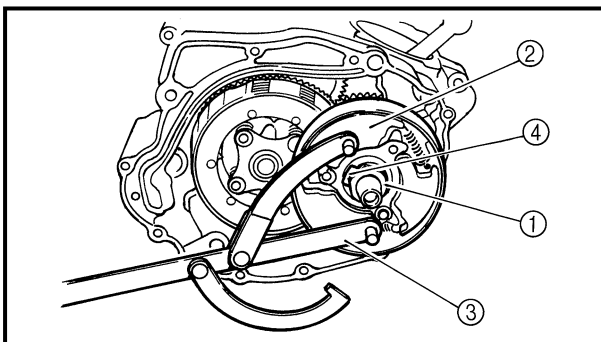
- Lock washer ①
- Nut ② (primary clutch)

### ⚠ WARNING

**Always use a new lock washer.**

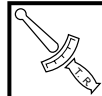
**NOTE:**

Make sure that the tabs of the lock washer engages the indentations in the clutch carrier.



13.Tighten:

- Nut ① (primary clutch)



**Nut (primary clutch):**  
**78 Nm (7.8 m • kg, 56 ft • lb)**

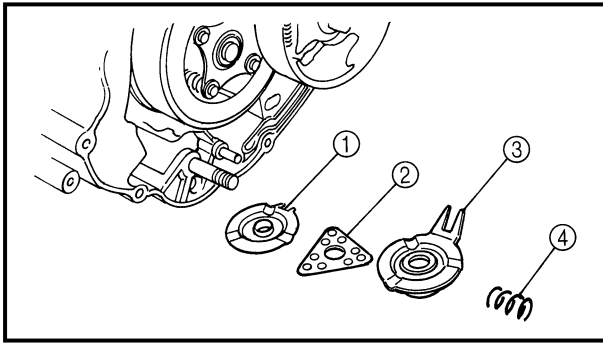
**NOTE:**

Hold the clutch carrier ② by the Rotor Holder ③ to tighten the nut.



**Rotor holder:**  
**P/N. YU-01235, 90890-01235**

14.Bend the lock washer tab ④.

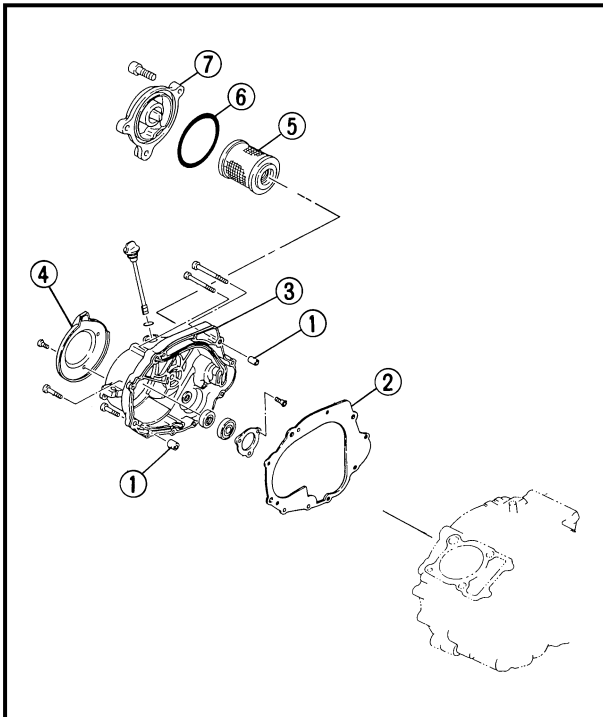
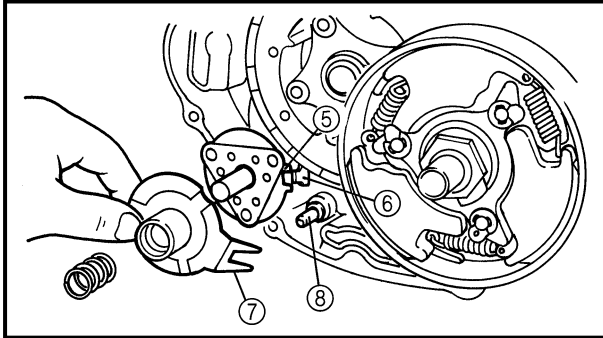


15.Install:

- Shift guide #2 ①
- Ball holder ②
- Shift guide #1 ③
- Spring ④ (clutch release lever)

**NOTE:**

- The slot ⑤ in the shift guide #2 must engage the shift shaft projection ⑥.
- The slot ⑦ in the shift guide #1 must engage the stopper shaft ⑧.



16.Install:

- Dowel pins ①
- Gasket ②
- Crankcase cover ③
- Clutch cover protector ④
- Oil filter ⑤
- O-ring ⑥
- Oil filter cover ⑦

### ⚠ WARNING

**Always use a new gasket.**

**NOTE:**

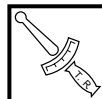
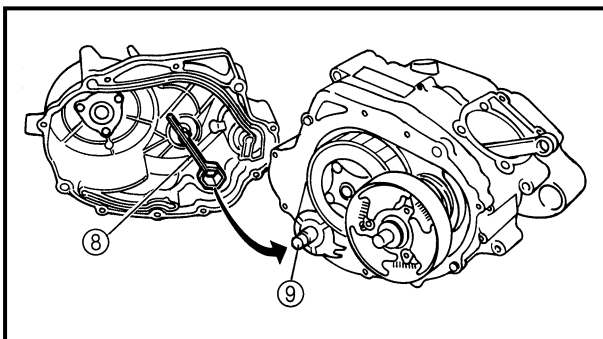
The clutch release lever ⑧ engages the shift guide #1 ⑨.

17.Tighten:

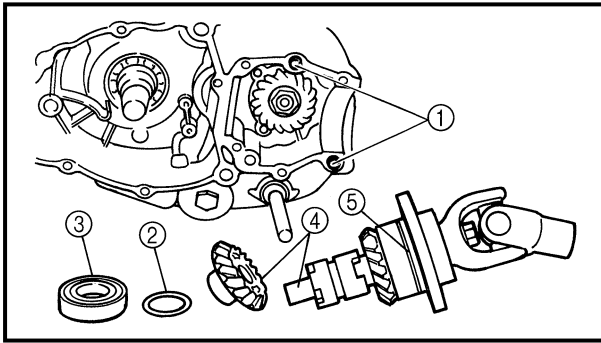
- Screws (crankcase cover)

**NOTE:**

Tighten the screws in stage, using a criss-cross pattern.



**Screws (crankcase cover):**  
7 Nm (0.7 m • kg, 5.1 ft • lb)



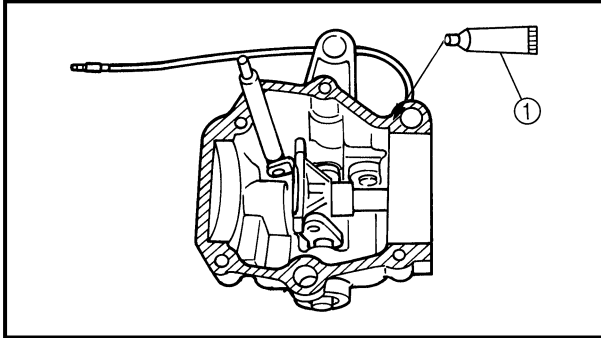
## MIDDLE DRIVEN PINION GEAR

### 1.Install:

- Dowel pins ①
- Shims ② (to middle driven shaft)
- Bearing ③
- Middle driven shaft assembly ④

### NOTE:

Apply the grease to the O-ring ⑤.

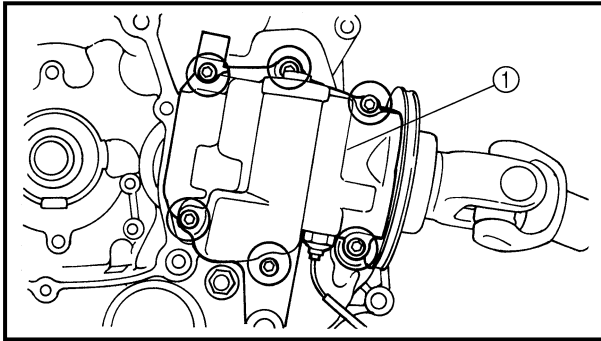


### 2.Apply:

- Sealant ①  
(to matching surface of middle shaft case cover)



**Sealant (Quick Gasket®):**  
**P/N. ACC-QUICK-GS-KT**  
**Yamaha Bond No. 1215:**  
**P/N. 90890-85505**



### 3.Install:

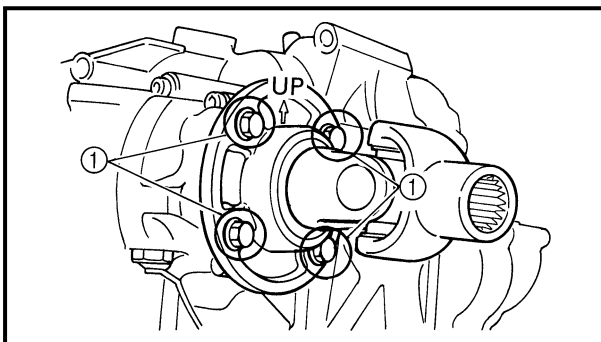
- Case cover ① (middle driven shaft)



**Bolt (middle shaft case cover):**  
**10 Nm (1.0 m • kg, 7.2 ft • lb)**

### NOTE:

Before installing the middle gear case cover onto the crankcase, shift the gear into "FORWARD".



### 4.Tighten:

- Bolts ① (bearing housing)



**Bolt (bearing housing):**  
**23 Nm (2.3 m • kg, 17 ft • lb)**

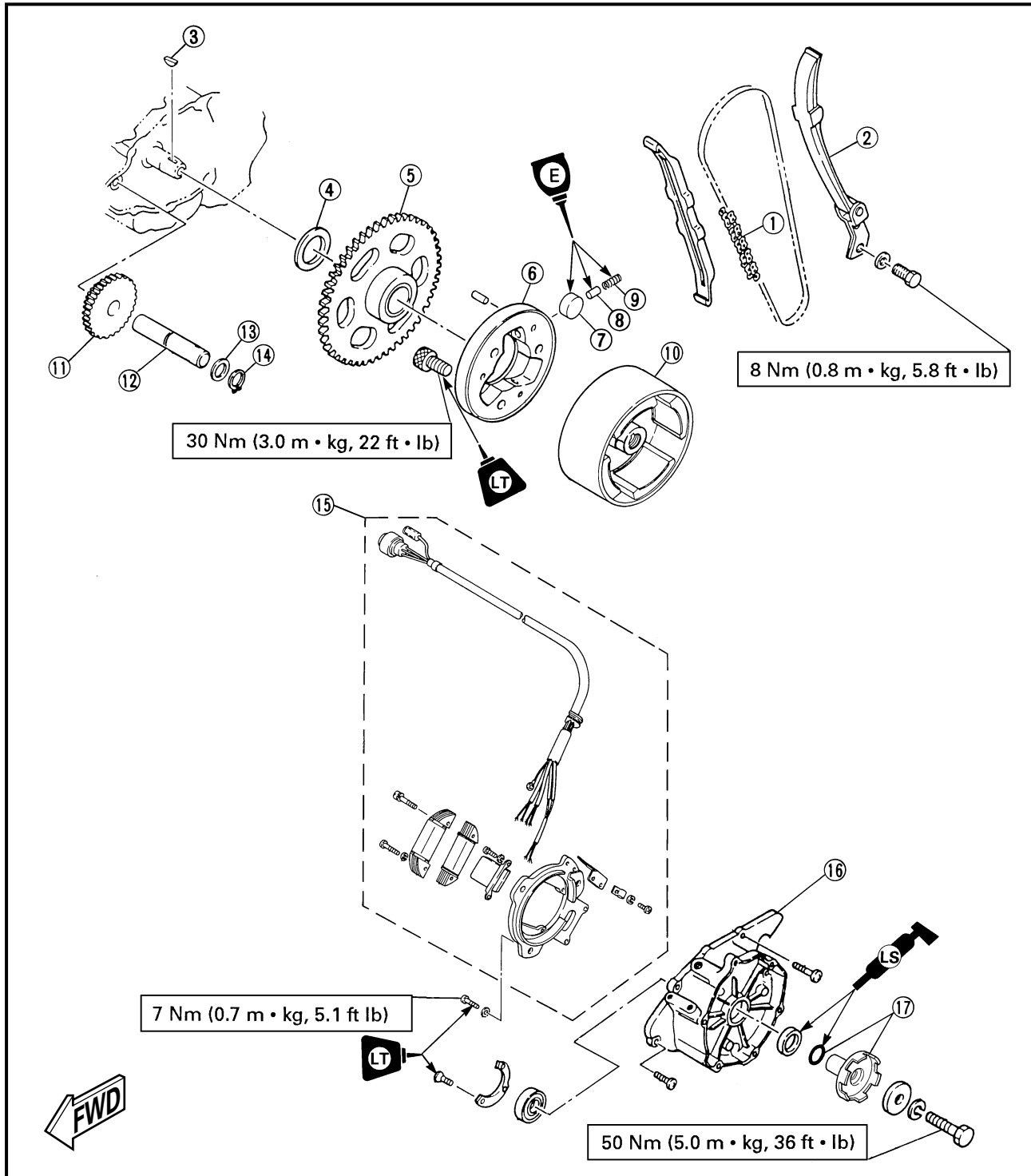
### NOTE:

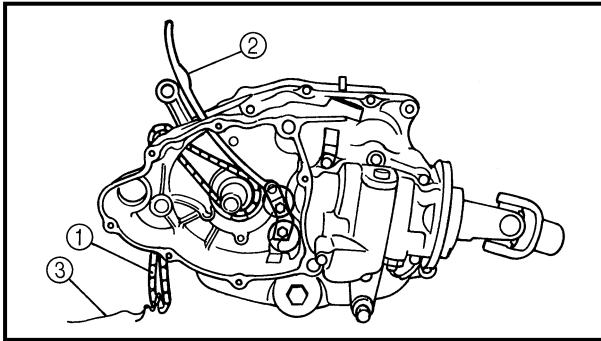
When installing the bearing housing onto the crankcase, make sure that the arrow sign is facing upwards.



### STARTER PULLEY (EXCEPT FOR USA)/CDI MAGNETO

- |                               |                          |
|-------------------------------|--------------------------|
| ① Timing chain                | ⑩ CDI magneto            |
| ② Timing chain guide (intake) | ⑪ Starter idle gear      |
| ③ Woodruff key                | ⑫ Shaft                  |
| ④ Washer                      | ⑬ Washer                 |
| ⑤ Starter driven gear         | ⑭ Circlip                |
| ⑥ Starter clutch              | ⑮ Stator assembly        |
| ⑦ Dowel pin                   | ⑯ Crankcase cover (left) |
| ⑧ Starter clutch spring cap   | ⑰ Starter pulley         |
| ⑨ Compression spring          |                          |

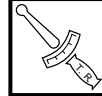




## STARTER PULLEY (EXCEPT FOR USA) AND CDI MAGNETO

### 1. Inspect:

- Timing chain ①
- Chain guide ② (intake)



**Chain guide (intake):**  
8 Nm (0.8 m • kg, 5.8 ft • lb)

### NOTE:

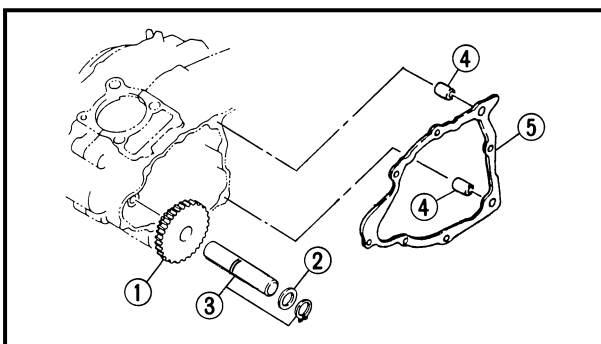
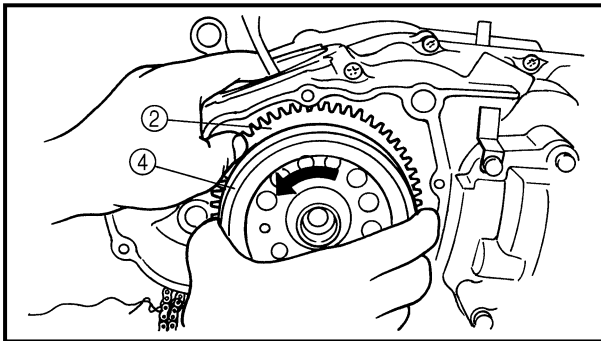
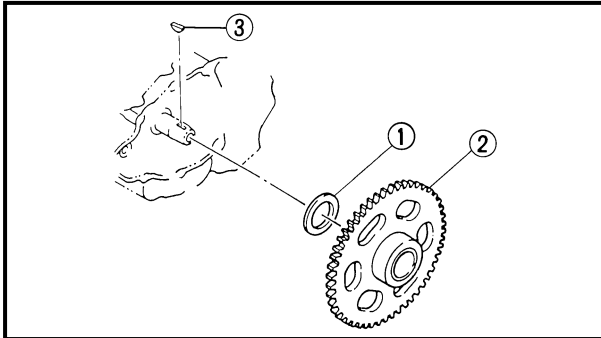
Fasten a safety wire ③ to the timing chain to prevent it from falling into the crankcase.

### 2. Install:

- Washer ①
- Driven gear ② (starter)
- Woodruff key ③
- CDI magneto ④

### NOTE:

- Clean the tapered portions of the crankshaft and CDI magneto.
- When installing the CDI magneto, make sure the key is properly seated in the key way of the crankshaft, and install the CDI magneto ④ to the crankshaft, then while holding the starter driven gear ②, set the CDI magneto to the driven gear, turn it counterclockwise.



### 3. Install:

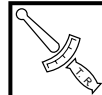
- Idle gear ① (starter)
- Washer ②
- Shaft ③
- Dowel pins ④
- Gasket ⑤

### ⚠ WARNING

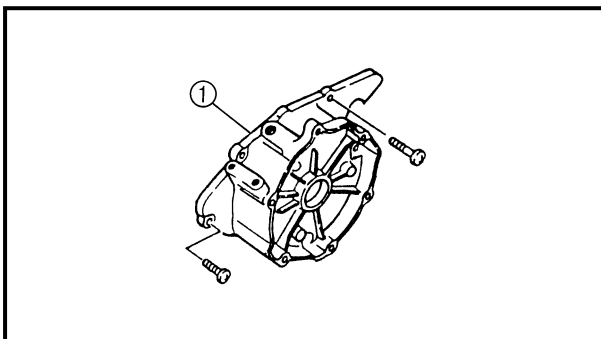
Always use a new gasket.

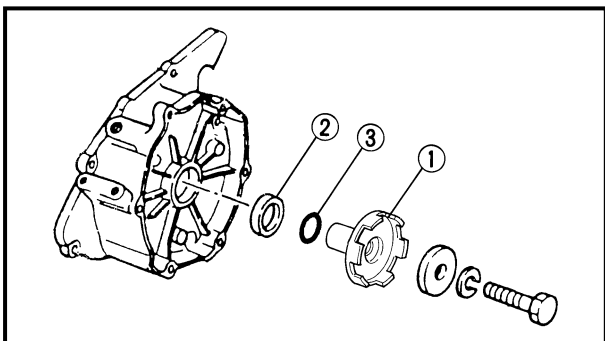
### 4. Install:

- Crankcase cover ① (left)
- Screws



**Screw (crankcase cover/crankcase spacer):**  
7 Nm (0.7 m • kg, 5.1 ft • lb)





5.Install:

- Starter pulley ①



**Bolt (starter pulley):**  
50 Nm (5.0 m • kg, 36 ft • lb)

**NOTE:**

- Hold the starter pulley by the Rotor Holder to tighten the bolt.



**Rotor holder:**  
P/N. YU-01235, 90890-01235

- Before installing the starter pulley, apply the grease to the oil seal rip ② and O-ring ③.

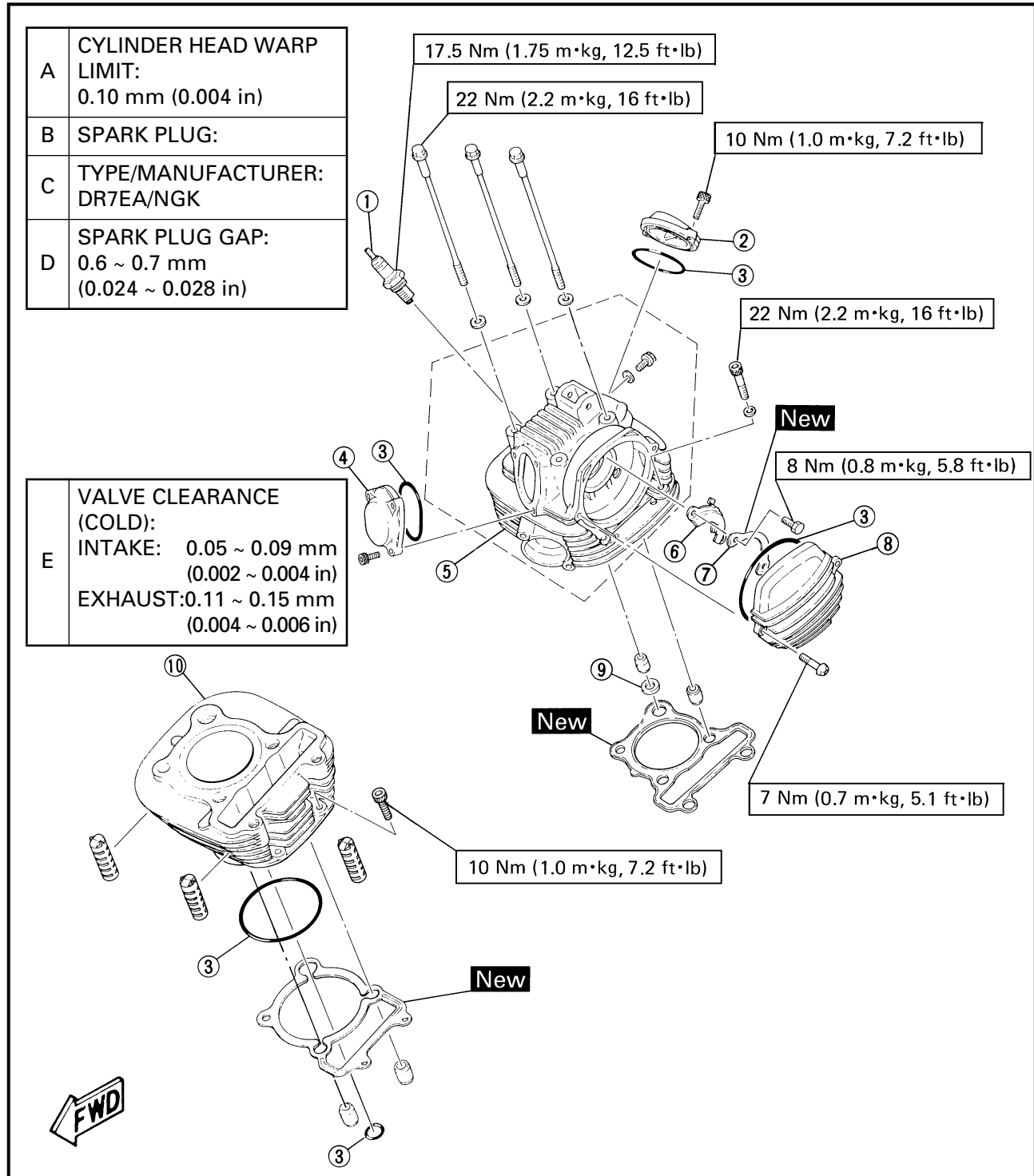


### CYLINDER AND CYLINDER HEAD ASSEMBLY

- ① Spark plug
- ② Tappet cover (intake)
- ③ O-ring
- ④ Tappet cover (exhaust)
- ⑤ Cylinder head
- ⑥ Bearing retainer
- ⑦ Lock washer
- ⑧ Cam sprocket cover
- ⑨ Oil seal
- ⑩ Cylinder

A	CYLINDER HEAD WARP LIMIT: 0.10 mm (0.004 in)
B	SPARK PLUG:
C	TYPE/MANUFACTURER: DR7EA/NGK
D	SPARK PLUG GAP: 0.6 ~ 0.7 mm (0.024 ~ 0.028 in)

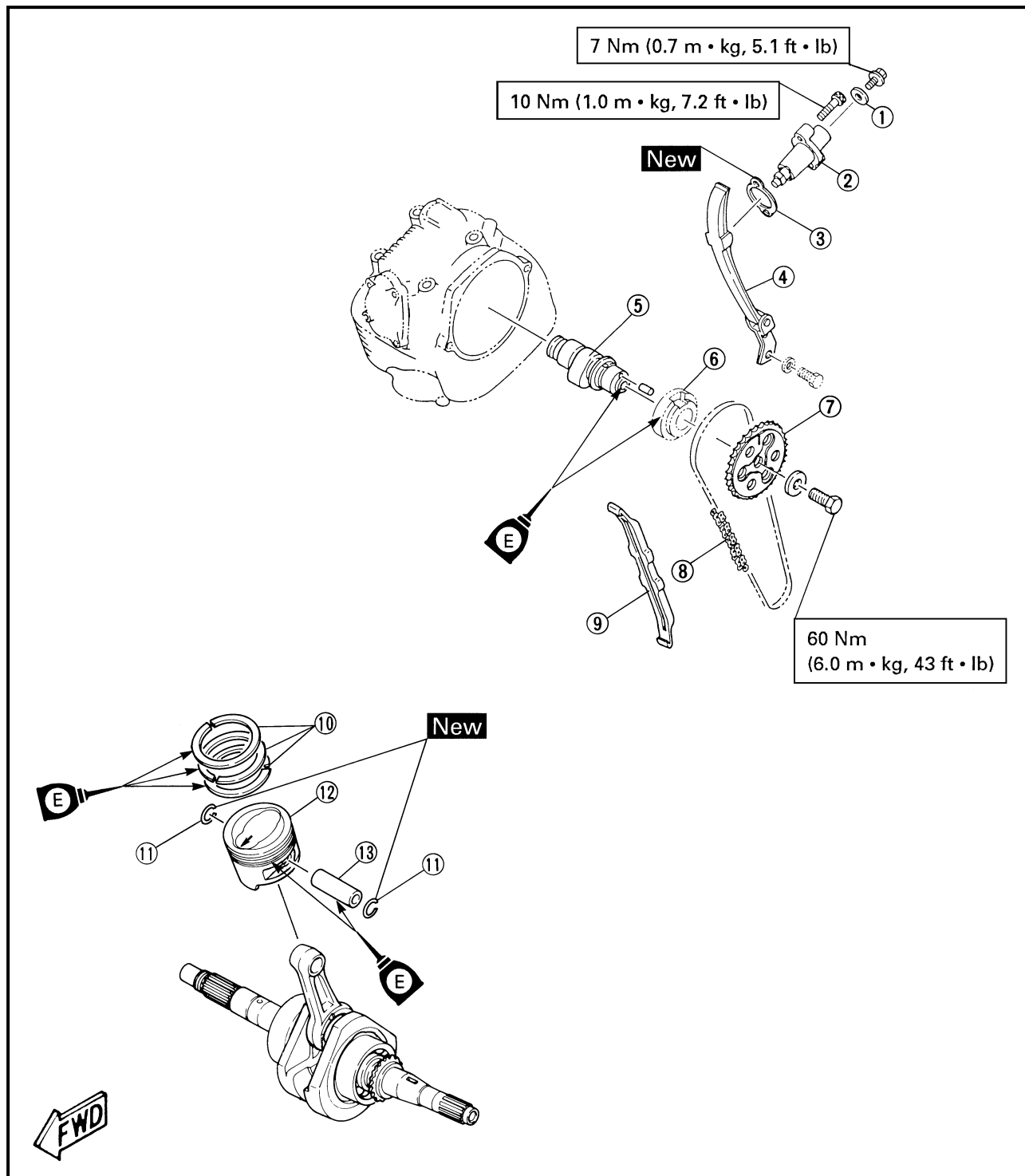
E	VALVE CLEARANCE (COLD): INTAKE: 0.05 ~ 0.09 mm (0.002 ~ 0.004 in) EXHAUST: 0.11 ~ 0.15 mm (0.004 ~ 0.006 in)
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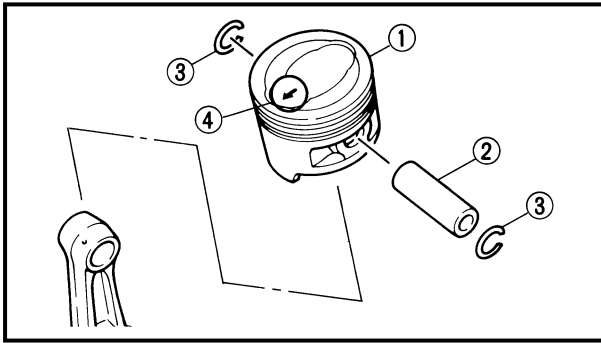


### PISTON, CAMSHAFT AND TIMING CHAIN

- |                               |                                |
|-------------------------------|--------------------------------|
| ① Gasket                      | ⑧ Timing chain                 |
| ② Timing chain tensioner      | ⑨ Timing chain guide (exhaust) |
| ③ Gasket                      | ⑩ Piston ring                  |
| ④ Timing chain guide (intake) | ⑪ Piston pin clip              |
| ⑤ Camshaft                    | ⑫ Piston                       |
| ⑥ Camshaft bushing            | ⑬ Piston pin                   |
| ⑦ Cam sprocket                |                                |







### CYLINDER HEAD ASSEMBLY, CYLINDER AND PISTON

1.Install:

- Piston ①
- Piston pin ②
- Piston pin clips ③

**NOTE:**

- The arrow ④ on the piston must point to the front of the engine.
- Before installing the piston pin clip, cover the crankcase with a clean towel or rag so you will not accidentally drop the pin clip and material into the crankcase.

### ⚠ WARNING

**Always use a new piston pin clip.**

2.Apply:

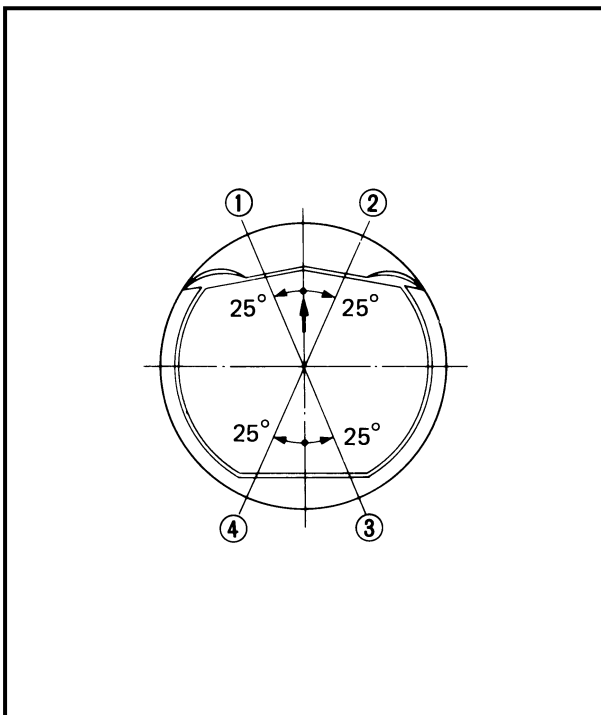
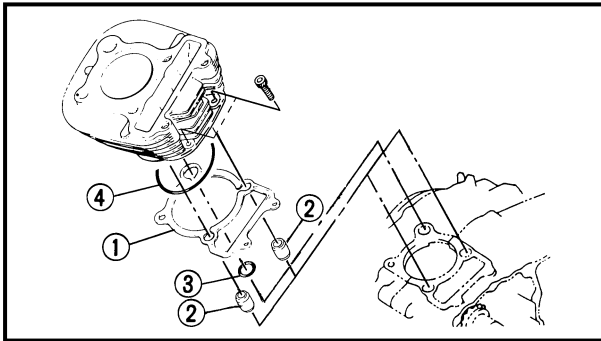
- 4-stroke engine oil
- To the piston pin, piston ring grooves and piston skirt areas.

3.Install:

- Gasket ① (cylinder)
- Dowel pins ②
- O-ring ③
- O-ring ④ (to cylinder)

### ⚠ WARNING

**Always use new gasket and O-ring.**

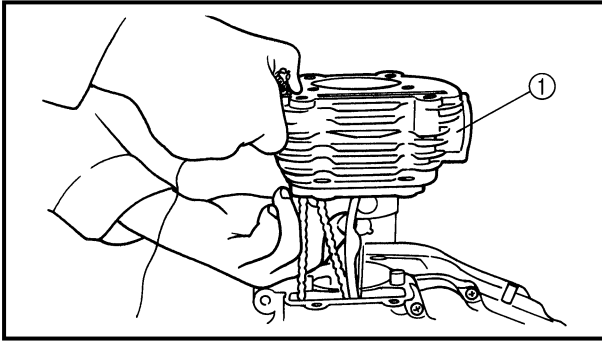


4.Offset the piston ring end gaps as shown.

**NOTE:**

- Be sure to check the manufacturer's marks or numbers stamped on the rings are on the top side of the rings.
- Before installing the cylinder, apply a liberal coating of 4-stroke engine oil to the piston rings.

- ① Top ring
- ② Oil ring (lower rail)
- ③ 2nd ring
- ④ Oil ring (upper rail)

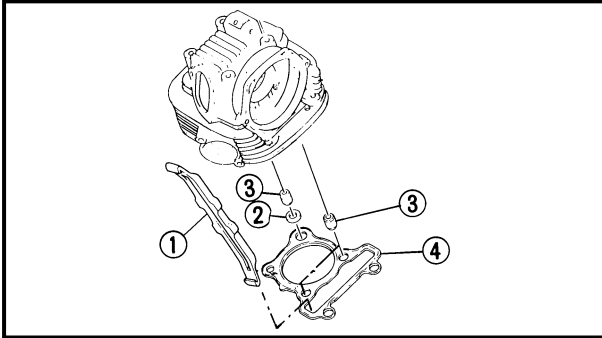


5.Install:

- Cylinder ①
- Bolts (cylinder)-temporary tighten

**NOTE:**

- Install the cylinder with one hand while compressing the piston rings with the other hand.
- Pass the timing chain through the chain cavity.



6.Install:

- Chain guide ① (exhaust)
- Oil seal ②
- Dowel pins ③
- Gasket ④ (cylinder head)

## ⚠ WARNING

**Always use a new gasket.**

7.Install:

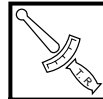
- Cylinder head assembly
- Bolts (cylinder head)

**NOTE:**

- Apply the 4-stroke engine oil onto the washers.
- Tighten the bolts starting with the lowest numbered one.
- The embossed numbers in the cylinder head designate the tightening sequence.

8.Tighten:

- Bolts ① ~ ④ (cylinder head)
- Bolts ⑤, ⑥ (cylinder head and cylinder)
- Bolts (cylinder)



**Bolt (cylinder head):**

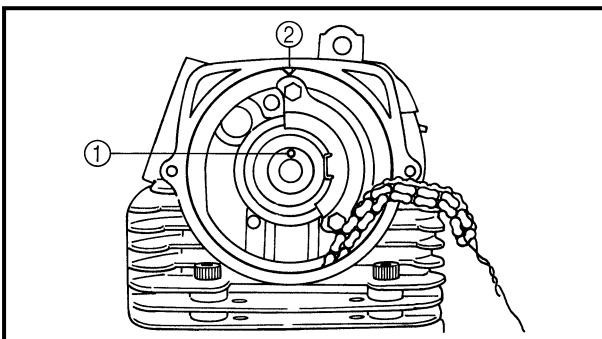
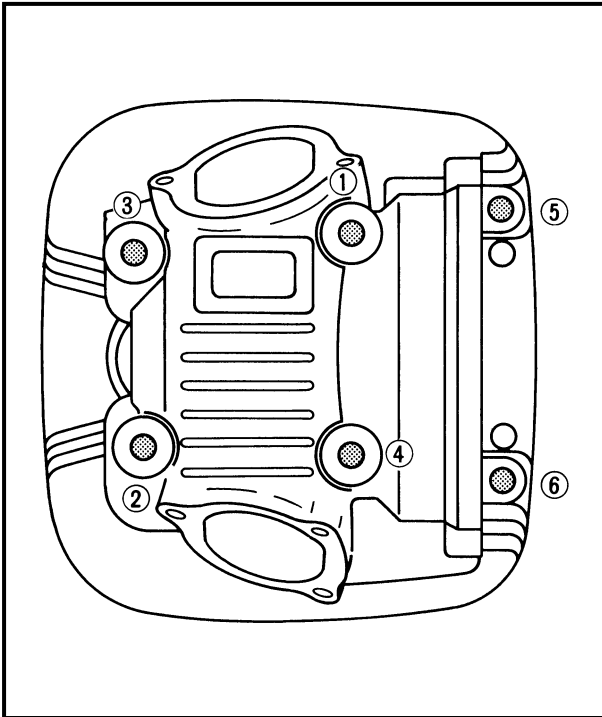
22 Nm (2,2 m • kg, 16 ft • lb)

**Bolt (cylinder head and cylinder):**

22 Nm (2.2 m • kg, 16 ft • lb)

**Bolt (cylinder):**

10 Nm (1.0 m • kg, 7.2 ft • lb)



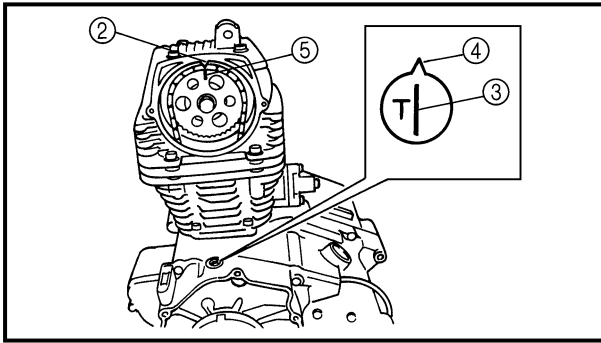
9.Install:

- Cam sprocket

\*\*\*\*\*

**Cam sprocket installing steps:**

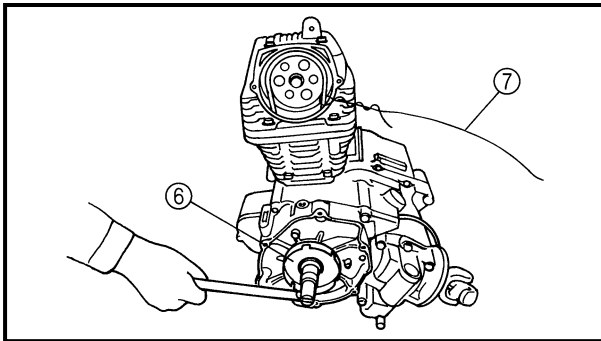
- Rotate the camshaft to align the camshaft pin ① with the cylinder head match mark ②.



- Turn the crankshaft counterclockwise until the TDC mark ③ is aligned with the stationary pointer ④ on the crankcase cover.
- Place the timing chain onto the cam sprocket.
- Install the cam sprocket onto the camshaft, and finger tighten the sprocket bolt.

**NOTE:**

- When installing the cam sprocket, keep the timing chain as tense as possible on the exhaust side.
- Align the pelete mark ⑤ on the cam sprocket with the stationary pointer ② on the cylinder head.



- Insert your finger into the timing chain tensioner hole, and push the timing chain damper inward.
- While pushing the timing chain damper, be sure cam sprocket match mark ⑤ aligns the cylinder head match mark ②.
- If marks are aligned, tighten the cam sprocket bolt.



**Bolt (cam sprocket):**  
60 Nm (6.0 m • kg, 43 ft • lb)

**NOTE:**

Hold the starter pulley ⑥ by the Rotor Holder to tighten the bolt of the cam sprocket.



**Rotor holder:**  
P/N. YU-01235, 90890-01235

- If marks do not align, change the meshing position of sprocket and chain.
- Remove a safety wire ⑦ from the timing chain.

\*\*\*\*\*

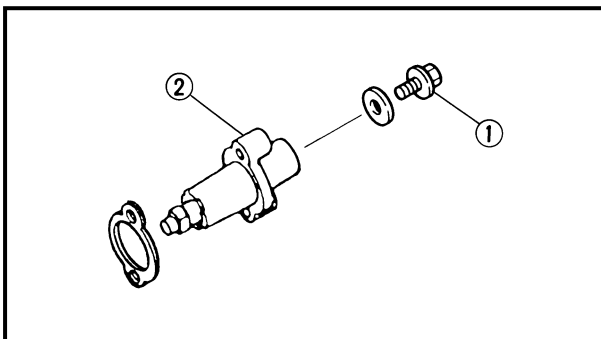
**10. Install:**

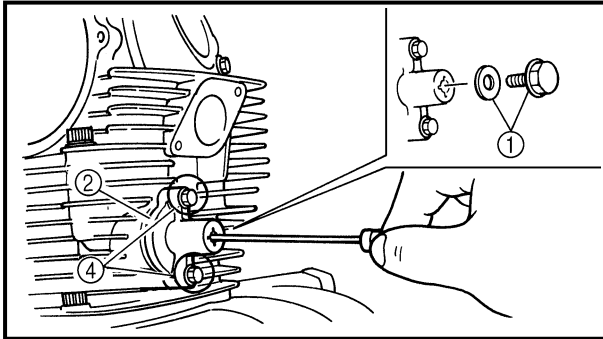
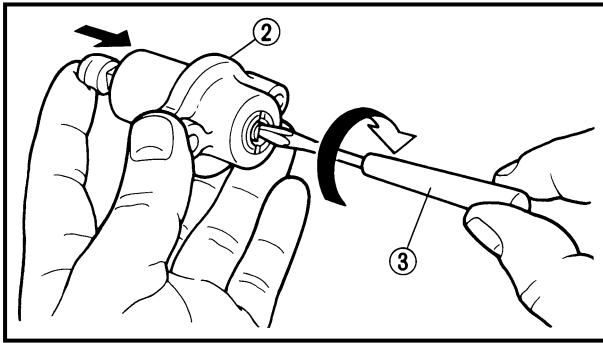
- Timing chain tensioner assembly

\*\*\*\*\*

**Installation steps:**

- Remove the chain tensioner cap ① from the chain tensioner assembly ②.



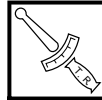


- Insert a small screwdriver ③ into the tensioner body slit. While pressing the tensioner rod, rotate the screwdriver clockwise until it stops turning.
- While holding the screwdriver in this position, and install the tensioner assembly ② (with the gasket) onto the cylinder, then temporarily tighten the tensioner assembly holding bolts ④.

#### ⚠ WARNING

**Always use a new gasket.**

- Remove the screwdriver from the tensioner body, and torque the tensioner assembly holding bolts.



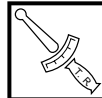
**Bolt (cam chain tensioner assembly):**

**10 Nm (1.0 m • kg, 7.2 ft • lb)**

- Install the tensioner cap ① with the gasket.

#### ⚠ WARNING

**Always use a new gasket.**



**Cam chain tensioner cap:**

**7 Nm (0.7 m • kg, 5.1 ft • lb)**

\*\*\*\*\*

#### 11.Adjust:

- Valve clearance

Refer to the "VALVE CLEARANCE ADJUSTMENT" section in CHAPTER 3.

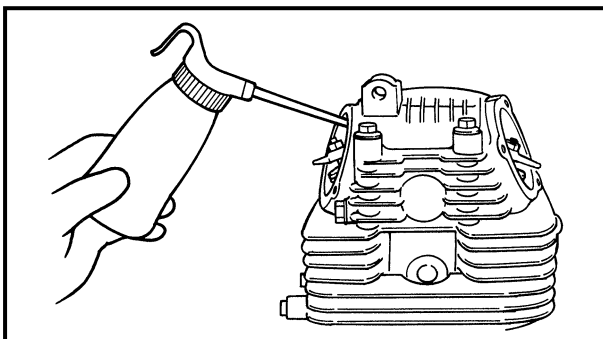


**Intake valve (cold):**

**0.05 ~ 0.09 mm (0.002 ~ 0.004 in)**

**Exhaust valve (cold):**

**0.11 ~ 0.15 mm (0.004 ~ 0.006 in)**



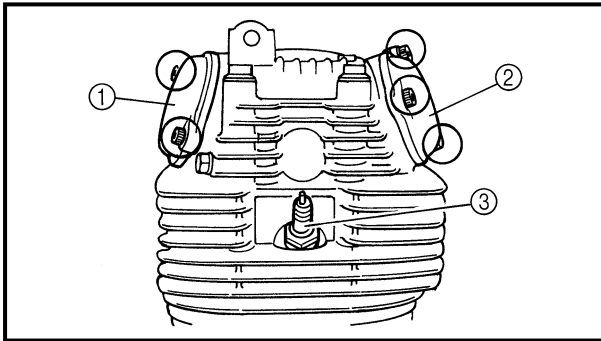
#### 12.Apply:

- 4-stroke engine oil  
(to the camshaft upper side)



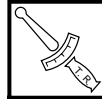
**Oil quantity:**

**0.05 L (0.044 Imp • qt, 0.053 US • qt)**



13.Install:

- Tappet cover ① (intake)
- Tappet cover ② (exhaust)
- Spark plug ③

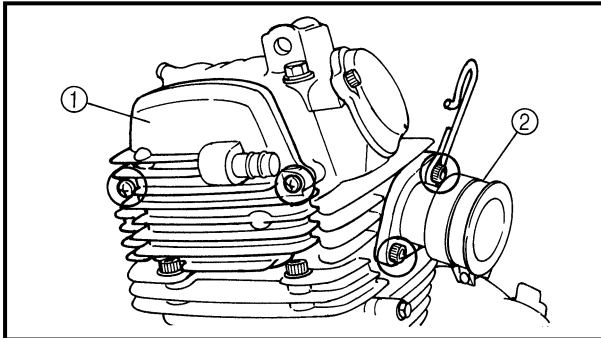


**Bolt (tappet cover):**

10 Nm (1.0 m • kg, 7.2 ft • lb)

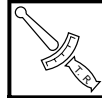
**Spark plug:**

17.5 Nm (17.5 m • kg, 12.5 ft • lb)



14.Install:

- Cam sprocket cover ①
- Carburetor joint ②



**Screw (cam sprocket cover):**

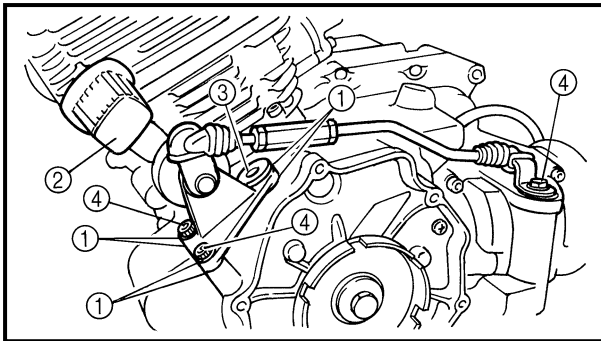
7 Nm (0.7 m • kg, 5.1 ft • lb)

**Bolt (carburetor joint):**

12 Nm (1.2 m • kg, 8.7 ft • lb)

**NOTE:**

Inspect the O-ring of the carburetor joint. If damaged, replace it.

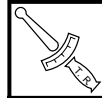


15.Install:

- Washers ①
- Drive select lever assembly ②

**NOTE:**

Before installing the drive select lever assembly, do not forget to fit the washers.

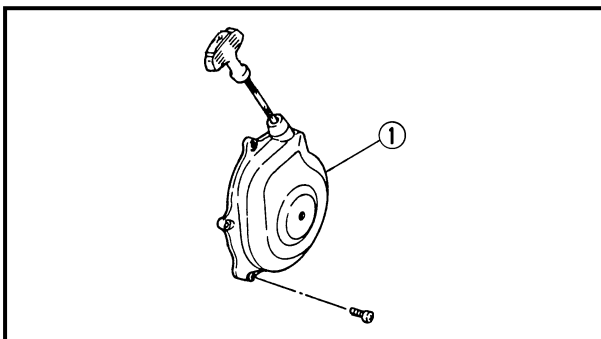


**Bolt ③ (drive select lever assembly):**

15 Nm (1.5 m • kg, 11 ft • lb)

**Bolt ④ (drive select lever assembly):**

12 Nm (1.2 m • kg, 8.7 ft • lb)



16.Install:

- Recoil starter assembly ①



**Recoil starter assembly:**

7 Nm (0.7 m • kg, 5.1 ft • lb)

**REMounting ENGINE**

Reverse the "ENGINE REMOVAL" procedure.

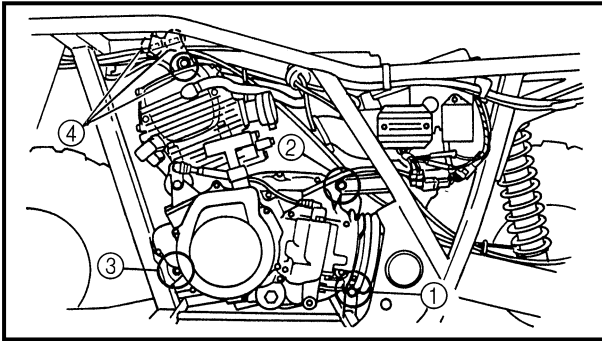
Note the following points.

**⚠ WARNING**

**Securely support the machine so there is no danger of it falling over.**

1.Install:

- Engine assembly  
(from right side)

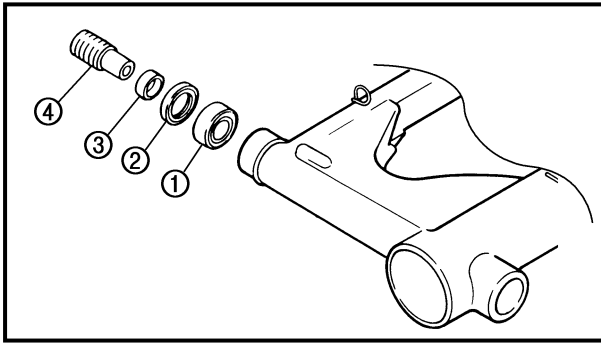


2.Install:

- Bolt ① (engine mounting - rear lower)
- Bolt ② (engine mounting - rear upper)
- Bolt ③ (engine mounting - front)
- Bolts ④ (engine mounting - top)

**NOTE:**

- All mounting bolts should be installed from the right of the machine.
- Temporary tighten the nuts and bolt, do not torque them at this point.



## 3.Install:

- Rear wheel drive assembly and swingarm.

## NOTE:

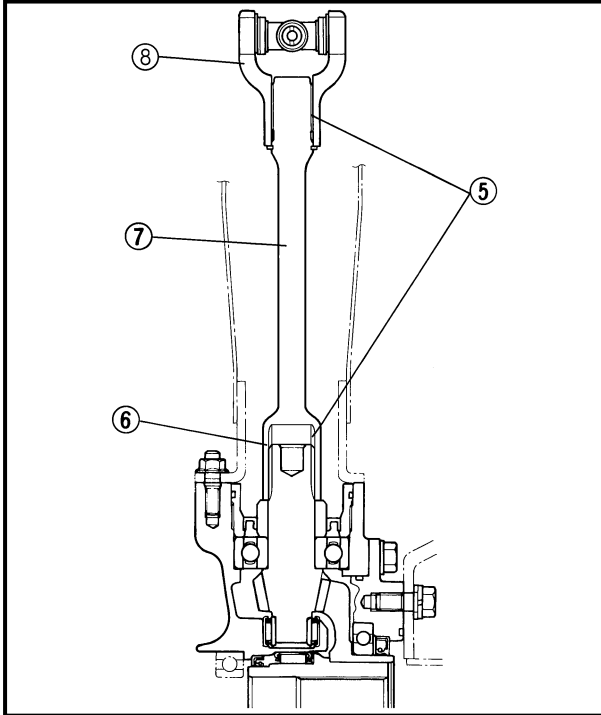
- Before installing the swingarm. Lubricate the following parts.

Swingarm pivot side:

- 1) Bearings ①
- 2) Oil seals ②
- 3) Collars ③
- 4) Pivot shafts ④

Drive shaft side:

- 1) Drive shaft splines ⑤
- 2) Coupling gear splines ⑥



## Lithium-soap Base Grease

- Before installing the swingarm, do not forget to fit the drive shaft ⑦.
- Insert the drive shaft ⑦ into the universal joint ⑧ properly.

## 4.Connect:

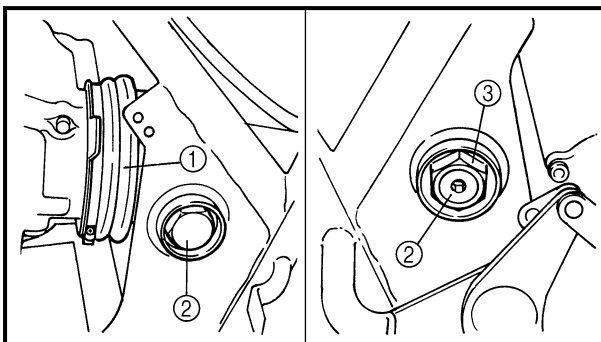
- Rubber boot ①

## 5.Install:

- Pivot shafts ② (swingarm)
- Locknut ③ (pivot shaft-right)

## NOTE:

Temporary tighten the pivot shafts and locknut, do not torque them at this point.



## 6.Check:

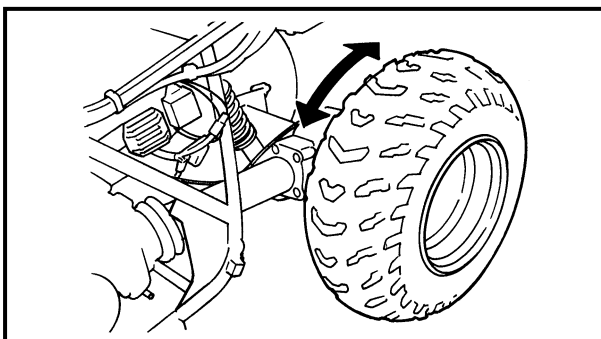
- Drive shaft operation

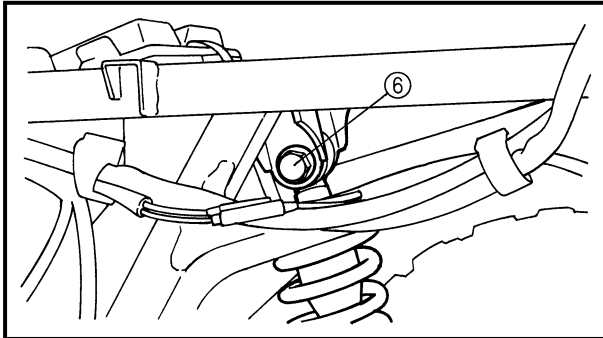
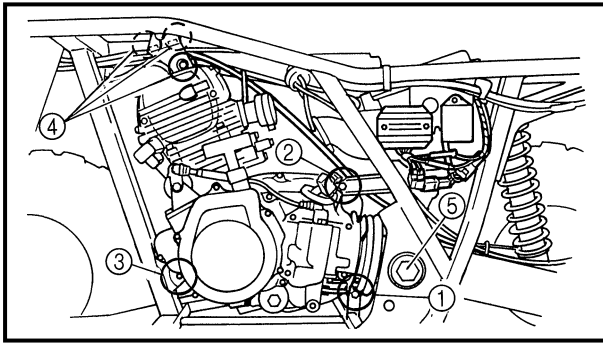
\*\*\*\*\*

## Checking steps:

- Block the front wheels, and elevate the rear wheels by placing the suitable stand under the frame.
- Move the rear wheels back and forth.
- Check the drive shaft operation. If there is unsmooth operation recheck the drive shaft condition of installation.

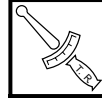
\*\*\*\*\*





### 7.Tighten:

- Bolt ① (engine mounting - rear lower)
- Bolt ② (engine mounting - rear upper)
- Bolt ③ (engine mounting - front)
- Bolts ④ (engine mounting - top)
- Pivot shafts ⑤ (swingarm)
- Locknut (pivot shaft - right)
- Bolt ⑥ (rear shock absorber - top)



### **Bolt (engine mounting - rear lower):**

**33 Nm (3.3 m • kg, 24 ft • lb)**

### **Bolt (engine mounting - rear upper):**

**33 Nm (3.3 m • kg, 24 ft • lb)**

### **Bolt (engine mounting - front):**

**48 Nm (4.8 m • kg, 35 ft • lb)**

### **Bolts (engine mounting - top):**

**33 Nm (3.3 m • kg, 24 ft • lb)**

### **Pivot shaft (swingarm - left):**

**130 Nm (13 m • kg, 94 ft • lb)**

### **Pivot shaft (swingarm - right):**

**6 Nm (0.6 m • kg, 4.3 ft • lb)**

### **Locknut (pivot shaft - right):**

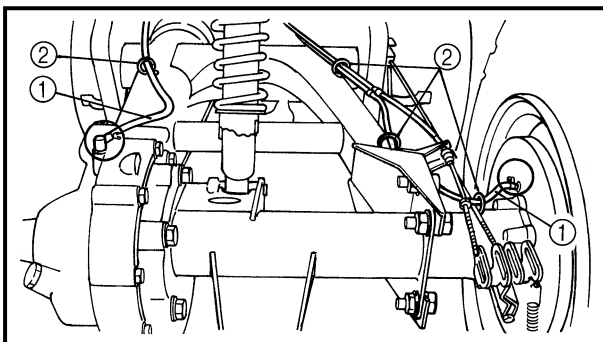
**130 Nm (13 m • kg, 94 ft • lb)**

### **Bolt (rear shock absorber - top):**

**50 Nm (5.0 m • kg, 36 ft • lb)**

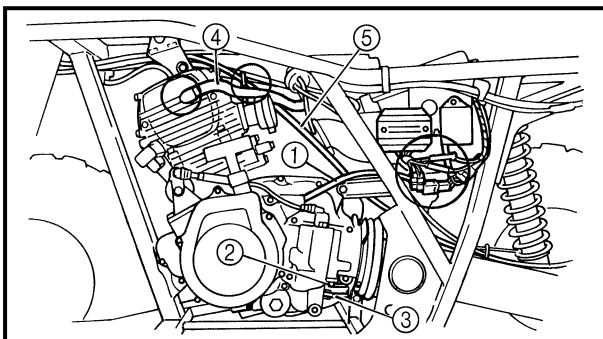
### 8.Install:

- Pivot shaft caps



### 9.Connect:

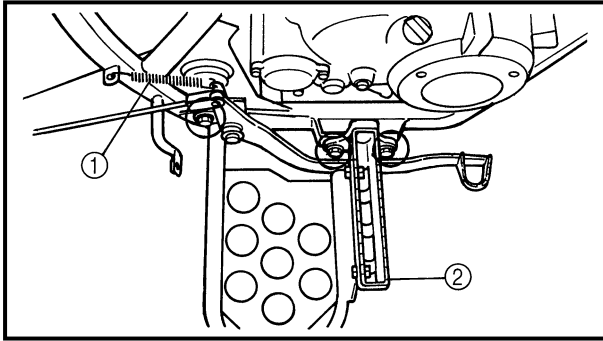
- Breather hose ① (final gear housing and rear brake drum)  
(to the cable guides ② of main frame)  
Refer to the "CABLE ROUTING" section in CHAPTER 2.



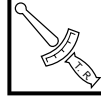
### 10.Connect:

- Spark plug lead
- CDI magneto leads ①
- "REVERSE" switch lead ②
- "NEUTRAL" switch lead ③
- Breather hose ④ (crankcase)
- Brake cable ⑤ (to cable guide)  
Refer to the "CABLE ROUTING" section in CHAPTER 2.

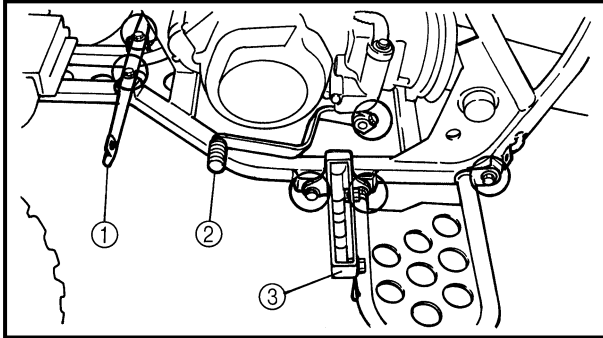




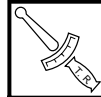
- 11.Install:
- Spring ①
  - Footrest ② (right)



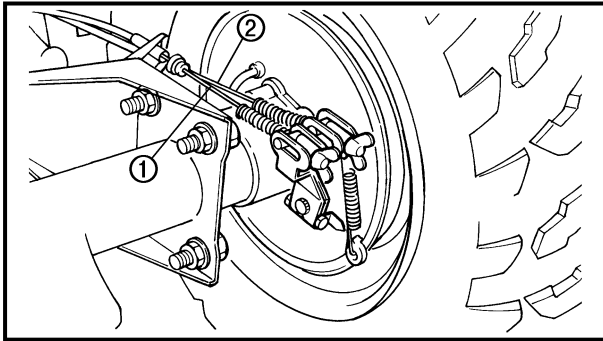
**Bolt (footrest):**  
65 Nm (6.5 m • kg, 47 ft • lb)



- 12.Install:
- Front fender stay ①
  - Shift pedal ②
  - Footrest ③ (left)



**Bolt (shift pedal):**  
10 Nm (1.0 m • kg, 7.2 ft • lb)  
**Bolt (footrest):**  
65 Nm (6.5 m • kg, 47 ft • lb)  
**Bolt (footrest plate):**  
30 Nm (3.0 m • kg, 22 ft • lb)



**NOTE:** \_\_\_\_\_  
The center of the shift pedal ② should be aligned with the top of the footrest ③.

- 13.Connect:
- Brake cable ① (rear)
  - Brake pedal rod ②

- 14.Adjust:
- Rear brake
- Refer to the "REAR BRAKE LEVER AND PEDAL ADJUSTMENT" section in CHAPTER 3.

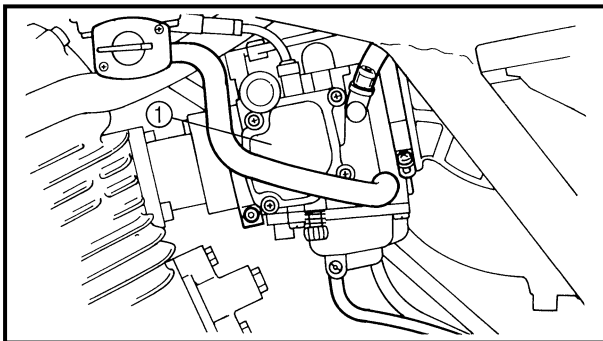
- 15.Install:
- Starter motor ①
  - Bracket ② (starter motor)

**NOTE:** \_\_\_\_\_  
Before installing the starter motor, apply the grease to the O-ring.



**Bracket (starter motor):**  
7 Nm (0.7 m • kg, 5.1 ft • lb)

- 16.Connect:
- Starter motor lead ③



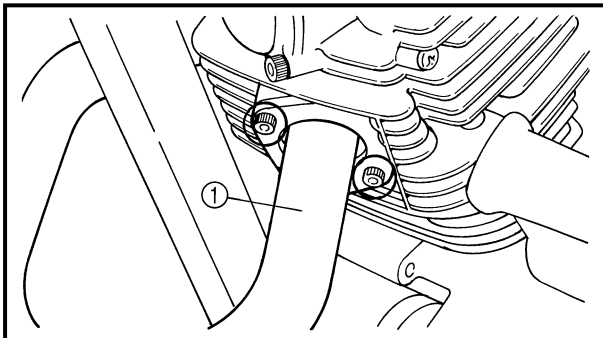
17.Install:

- Carburetor ①

Refer to "CARBURETOR" section in the CHAPTER 5.

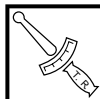


**Hose clamp:**  
2 Nm (0.2 m • kg, 1.4 ft • lb)

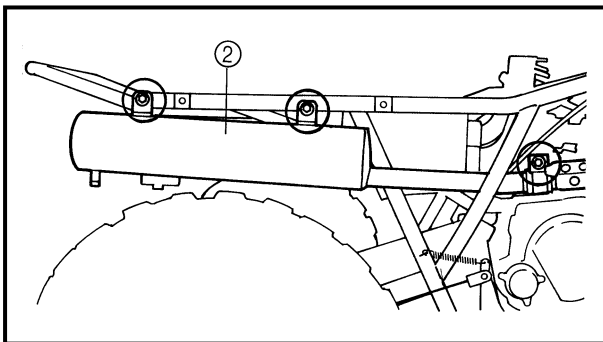


18.Install:

- Exhaust pipe ①
- Muffler ②



**Bolt (muffler):**  
34 Nm (3.4 m • kg, 25 ft • lb)  
**Bolt (muffler and exhaust pipe):**  
20 Nm (2.0 m • kg, 14 ft • lb)  
**Bolt (exhaust pipe):**  
10 Nm (1.0 m • kg, 7.2 ft • lb)



19.Fill:

- Crankcase



**Total amount:**  
1.8 L (1.6 Imp qt, 1.9 US qt)

Refer to the "ENGINE OIL REPLACEMENT" section in CHAPTER 3.

20.Adjust:

- Release lever free play (clutch)  
Refer to the "CLUTCH ADJUSTMENT" section in CHAPTER 3.

21.Adjust:

- Drive select lever position  
Refer to the "DRIVE SELECT LEVER POSITION ADJUSTMENT" section in CHAPTER 3.



22.Install:

- Rear fender
- Rear carrier
- Front fender
- Front bumper
- Front carrier
- Fuel tank
- Seat

Refer to the "FENDERS AND FUEL TANK-Installation" section in CHAPTER 3.

23.Inspect:

- Oil leakage

24.Check:

- "NEUTRAL" indicator light operation
  - "REVERSE" indicator light operation
- Poor operation → Repair.



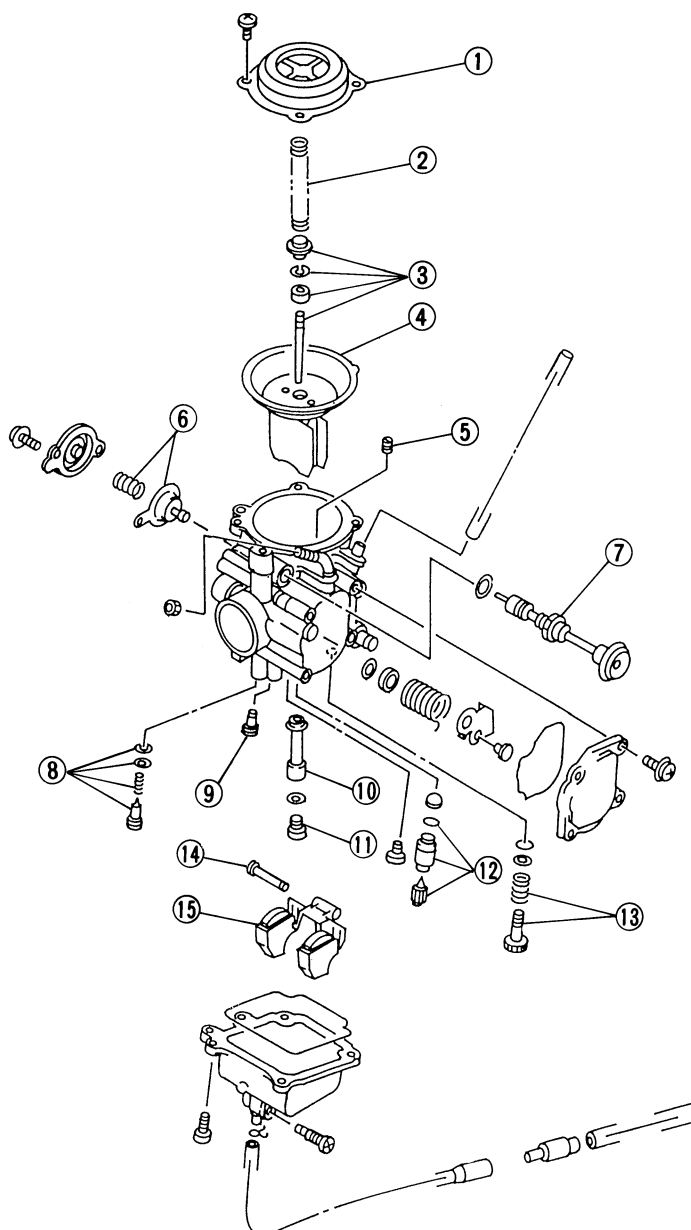
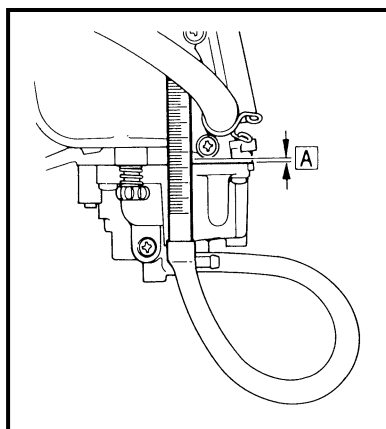


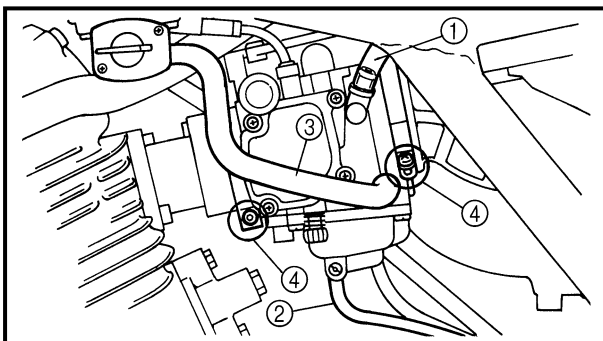
## CARBURETION

### CARBURETOR

- ① Vacuum chamber cover
- ② Spring
- ③ Jet needle set
- ④ Piston valve
- ⑤ Pilot air jet
- ⑥ Coasting enricher diaphragm
- ⑦ Starter plunger assembly
- ⑧ Pilot screw set
- ⑨ Pilot jet
- ⑩ Needle jet
- ⑪ Main jet
- ⑫ Needle valve set
- ⑬ Throttle stop screw
- ⑭ Float pin
- ⑮ Float

SPECIFICATIONS	
ID MARK	4XE1 00
MAIN JET (M.J.)	#95
PILOT JET (P.J.)	#42.5
JET NEEDLE (J.N.)	5CE35
NEEDLE JET (N.J.)	P-2 (823)
PILOT SCREW (P.S.)	2 turns out
FLOAT HEIGHT (F.H.)	12 ~ 14 mm (0.47 ~ 0.55 in)
FUEL LEVEL $\Delta$ (F.L.)	1.0 ~ 2.0 mm (0.04 ~ 0.08 in)
ENGINE IDLING SPEED	Above the float chamber mating surface 1,400 ~ 1,500 r/min





## REMOVAL

1. Turn the fuel cock lever to "OFF".

2. Remove:

- Air vent hose ①
- Overflow hose ②
- Fuel hose ③

3. Loosen:

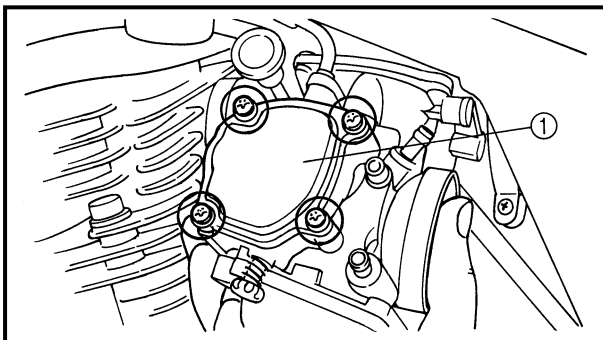
- Clamp screws ④

4. Remove:

- Carburetor assembly

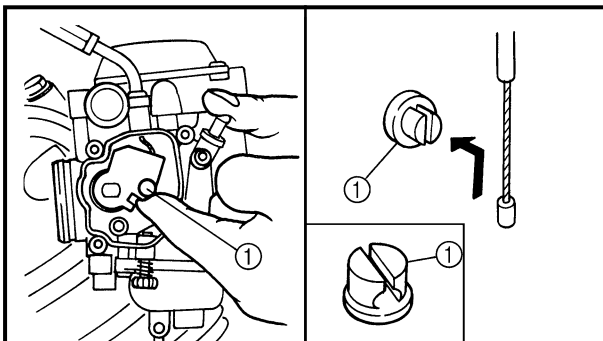
5. Remove:

- Throttle valve cover ①



6. Remove:

- Throttle cable end ①

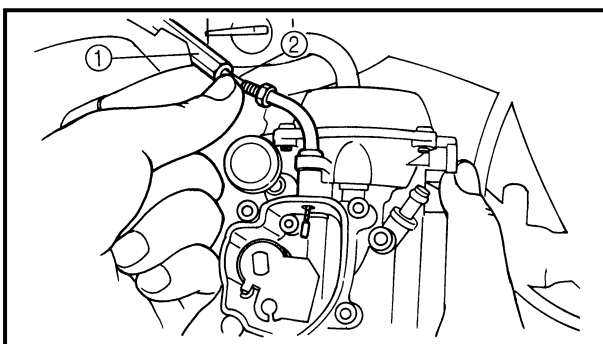


7. Loosen:

- Throttle cable adjusting nut ①

8. Remove:

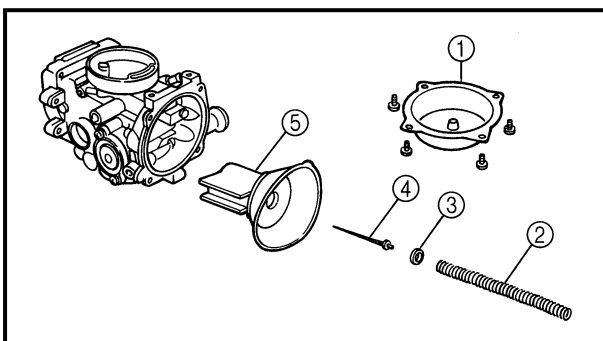
- Throttle cable ②

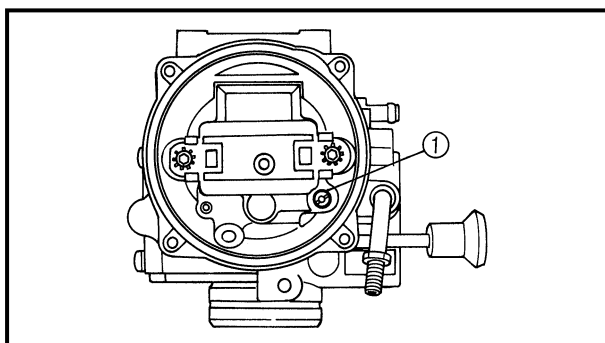


## DISASSEMBLY

1. Remove:

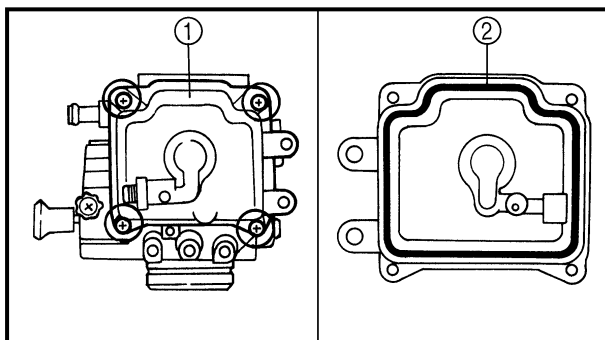
- Vacuum chamber cover ①
- Spring ②
- Spring seat ③
- Jet needle set ④
- Piston valve ⑤





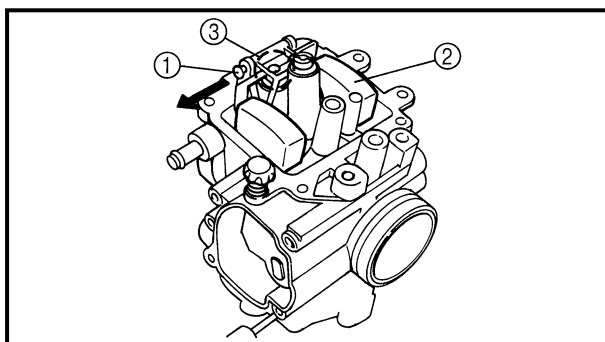
2.Remove:

- Pilot air jet ①



3.Remove:

- Float chamber ①
- O-ring ②



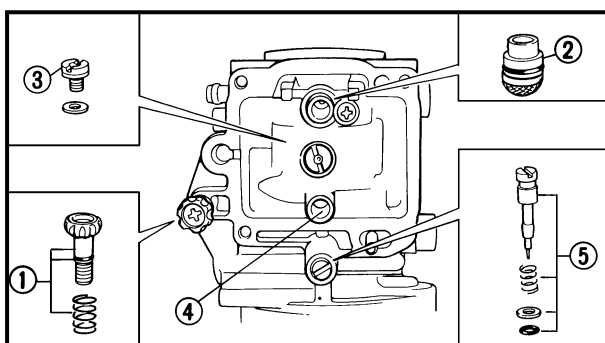
4.Remove:

- Float pin ①
- Float ②
- Needle valve ③

**NOTE:**

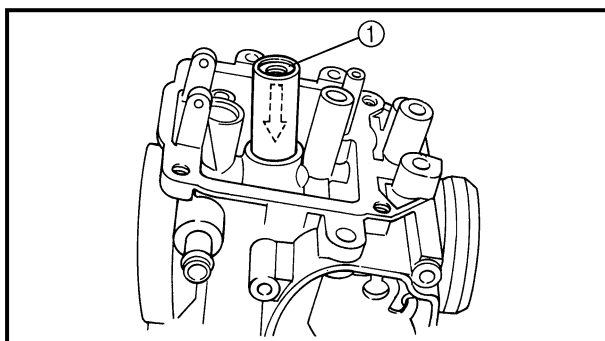
Remove the float pin in the direction of the arrow.

5



5.Remove:

- Throttle stop screw ①
- Valve seat ②
- Main jet ③
- Pilot jet ④
- Pilot screw set ⑤

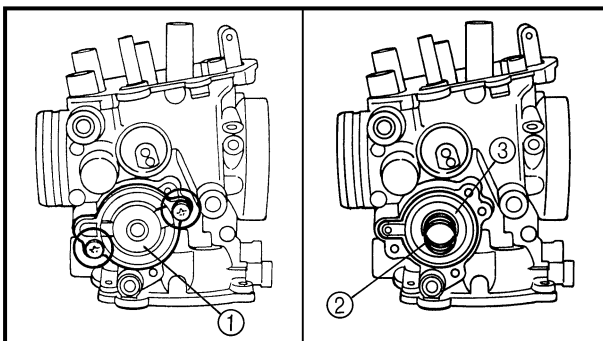


6.Remove:

- Needle jet ①

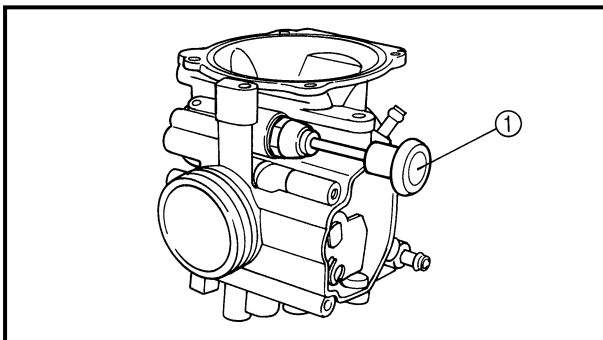
**NOTE:**

Remove the needle jet towards the piston valve side.



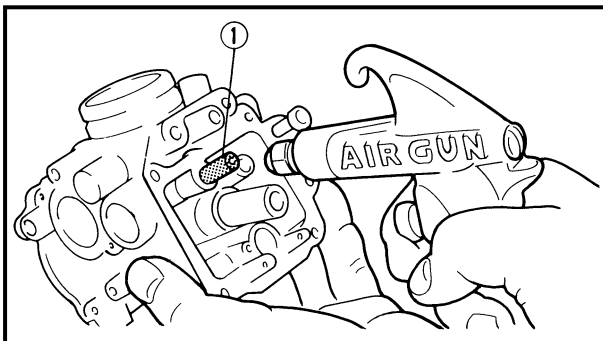
## 7.Remove:

- Cover (coasting enricher) ①
- Spring ②
- Diaphragm ③



## 8.Remove:

- Starter plunger ①



## INSPECTION

## 1.Inspect:

- Carburetor body
- Starter jet ①
- Float chamber  
Cracks/damage → Replace.
- Fuel passage  
Contamination → Clean as indicated.
- Fuel chamber body  
Contamination → Clean.

\*\*\*\*\*

## Cleaning steps:

- Wash the carburetor in a petroleum based solvent.  
(Do not use any caustic carburetor cleaning solution.)
- Blow out all of the passages and jets with compressed air.

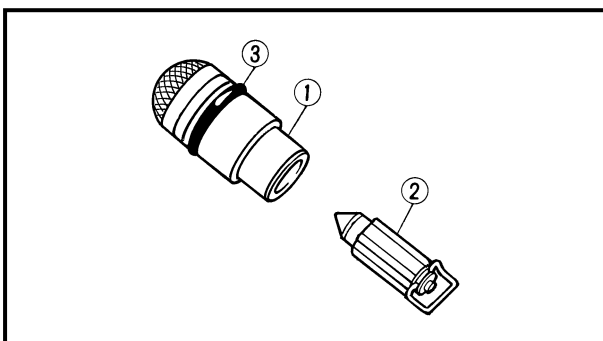
\*\*\*\*\*

## 2.Inspect:

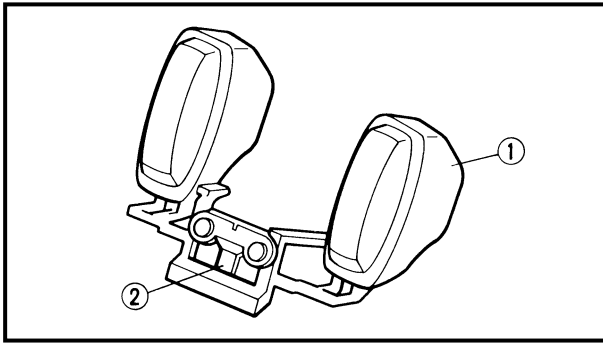
- Valve seat ①
- Needle valve ②
- O-ring ③  
Contamination/wear/damage → Replace as a set.

## NOTE:

Always replace the needle valve and valve seat as a set.

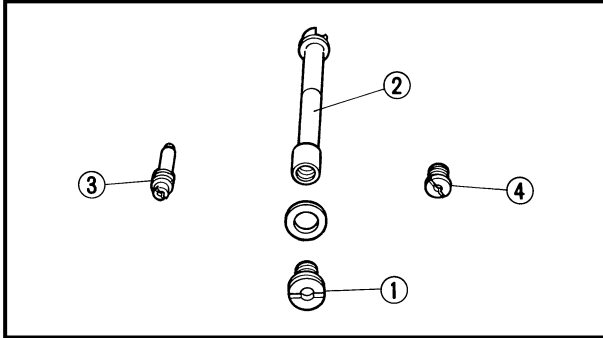






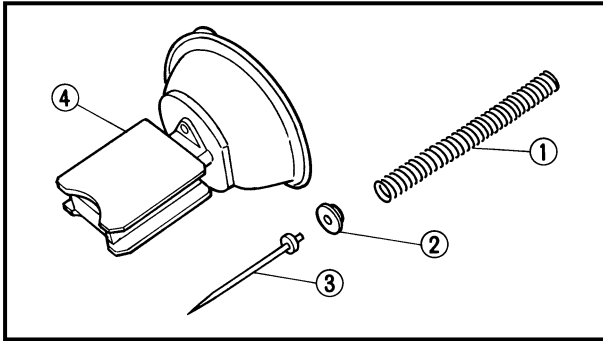
## 3.Inspect:

- Float ①
  - Float tang ②
- Damage → Replace.



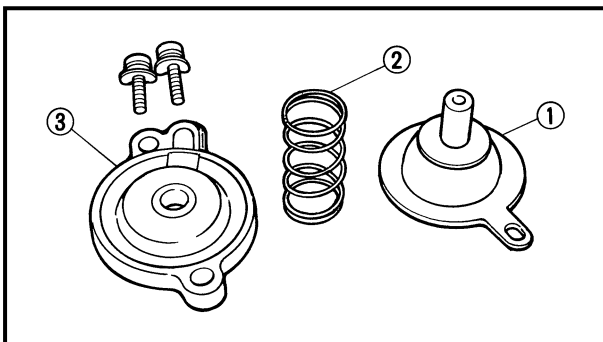
## 4.Inspect:

- Main jet ①
  - Needle jet ②
  - Pilot jet ③
  - Pilot air jet ④
- Wear/damage → Replace.  
Contamination → Blow out the jets with compressed air.



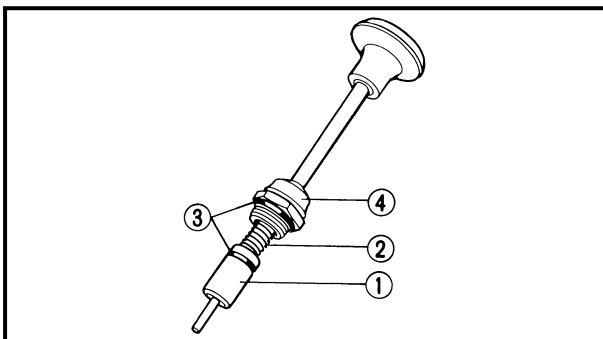
## 5.Inspect:

- Spring ①
  - Spring seat ②
  - Jet needle set ③
  - Piston valve ④
- Bends/wear/damage → Replace.



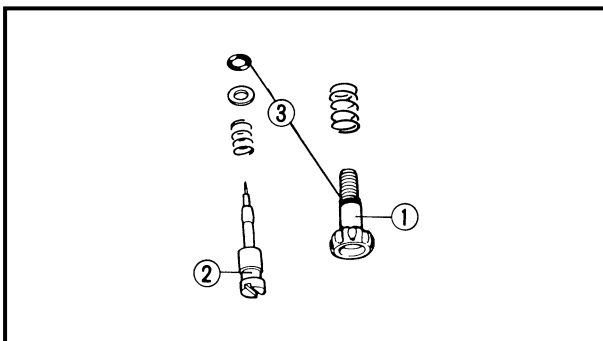
## 6.Inspect:

- Diaphragm (coasting enricher) ①
  - Spring ②
  - Cover ③
- Tears (diaphragm) /damage → Replace.



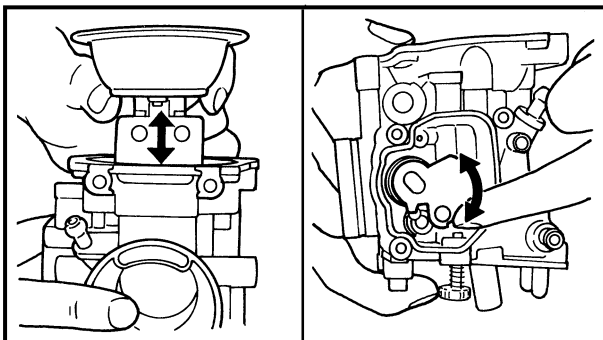
## 7.Inspect:

- Starter plunger ①
  - Spring ②
  - O-ring ③
  - Plunger cap cover ④
- Damage → Replace.



## 8. Inspect:

- Throttle stop screw ①
- Pilot screw ②
- Contamination/wear → Replace.
- O-ring ③
- Damage → Replace.



## 9. Check:

- Free movement (piston valve)
- Sticks → Replace.
- Insert the piston valve into the carburetor body, and check for free movement.

## 10. Check:

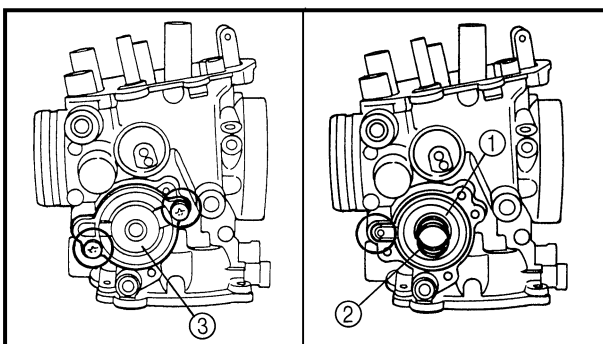
- Free movement (throttle valve)
- Sticks → Replace.

**ASSEMBLY**

Reverse the "DISASSEMBLY" procedure.  
Note the following points.

**CAUTION:**

- Before reassembling, wash all of the parts in a clean petroleum based solvent.
- Always use a new gasket.

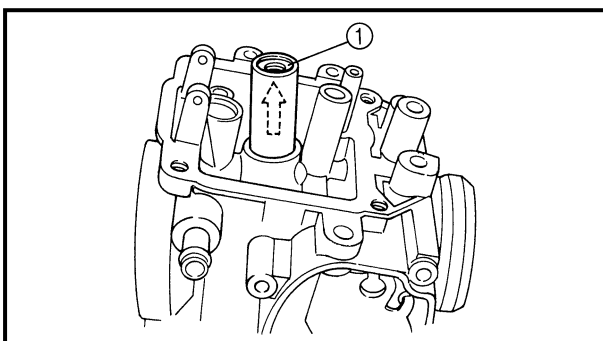


## 1. Install:

- Diaphragm (coasting enricher) ①
- Spring ②
- Cover ③

**NOTE:**

Match the tab on the rubber diaphragm to the matching recess in the carburetor body.



## 2. Install:

- Needle jet ①

**NOTE:**

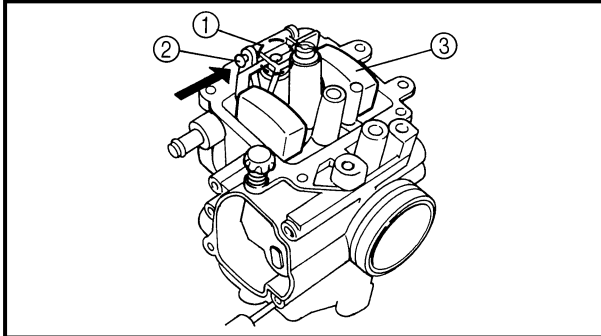
Align the cut end of the needle jet with the slot on the body.



## 3.Install:

- O-ring
- Washer
- Spring
- Pilot screw

**Pilot screw:  
2 turns out**

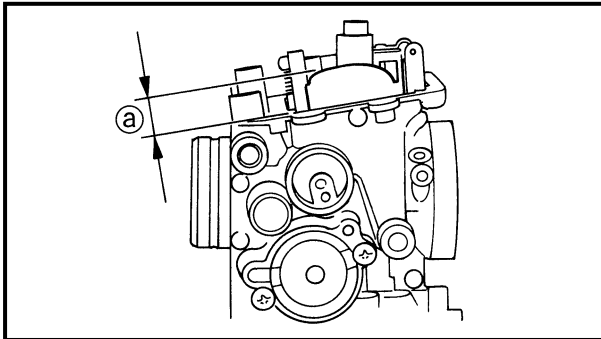


## 4.Install:

- Needle valve ①
- Float ②
- Float pin ③

**NOTE:**

Install the float pin in the direction of the arrow.



## 5.Measure:

- Float height ①
- Out of specification → Adjust.



**Float height (F.H.):**  
**12 ~ 14 mm (0.47 ~ 0.55 in)**

\*\*\*\*\*

**Measurement and adjustment steps:**

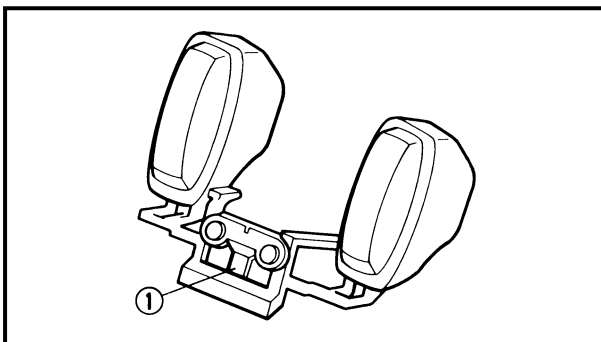
- Hold the carburetor in an upside down position.
- Measure the distance from the front mating surface of the float chamber (gasket removed) to the top of the float.

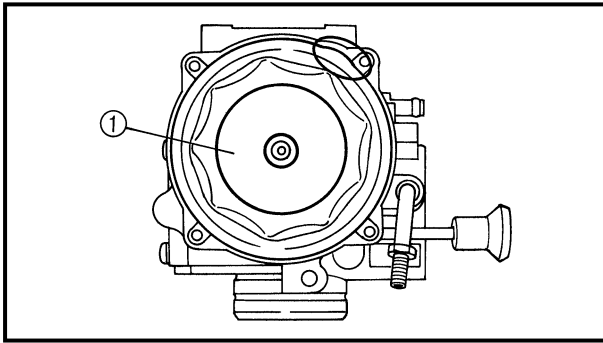
**NOTE:**

The float arm should be resting on the needle valve, but not compressing it.

- If the float height is not within the specification, inspect the valve seat and needle valve.
- If either is worn, replace them both.
- If both are fine, adjust the float height by bending the float tang ① on the float.
- Recheck the float height.

\*\*\*\*\*





6.Install:

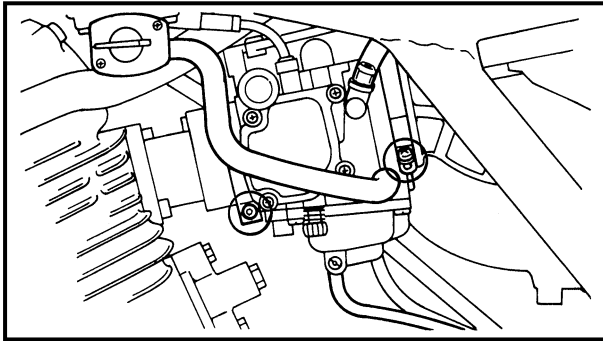
- Piston valve ①

**NOTE:**

Match the tab on the rubber diaphragm to the matching recess in the carburetor body.

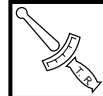
**INSTALLATION**

Reverse the "REMOVAL" procedure. Note the following points.



1.Install:

- Carburetor assembly



**Clamp screw:**  
2 Nm (0.2 m • kg, 1.4 ft • lb)

2.Adjust:

- Idle speed

Refer to "IDLE SPEED ADJUSTMENT" in CHAPTER 3.



**Engine idle speed:**  
1,400 ~ 1,500 r/min

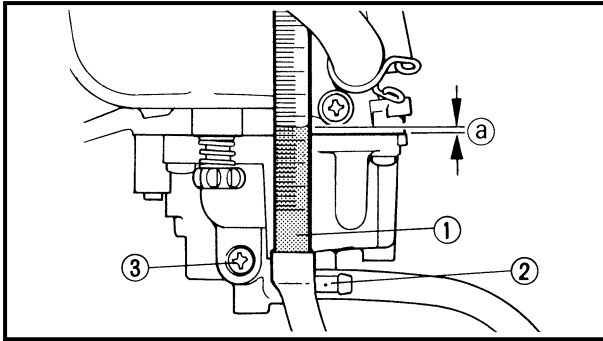
3.Adjust:

- Throttle lever free play

Refer to "THROTTLE CABLE FREE PLAY ADJUSTMENT" in CHAPTER 3.



**Throttle lever free play:**  
3 ~ 5 mm (0.12 ~ 0.20 in)



## FUEL LEVEL ADJUSTMENT

1.Measure:

- Fuel level ①

Out of specification → Adjust.



**Fuel level:**

**1.0 ~ 2.0 mm (0.04 ~ 0.08 in)**

**Above the float chamber mating surface**

\*\*\*\*\*

## Fuel level measurement and adjustment steps:

steps:

- Place the machine on a level surface.
- Connect the fuel level gauge ① to the drain pipe ②.

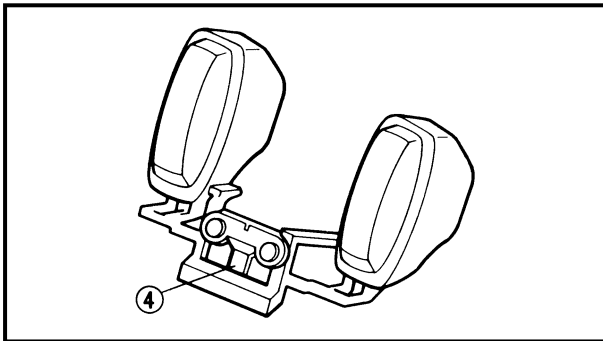


**Fuel level gauge:**

**P/N. YM-01312-A, 90890-01312**

- Loosen the drain screw ③.
- Hold the gauge vertically next to the float chamber line.
- Measure the fuel level ① with the gauge.
- If the fuel level is incorrect, adjust the fuel level.
- Remove the carburetor.
- Inspect the valve seat and needle valve.
- If either is worn, replace them both.
- If both are fine, adjust the float level by bending the float tang ④ slightly.
- Install the carburetor.
- Recheck the fuel level.

\*\*\*\*\*



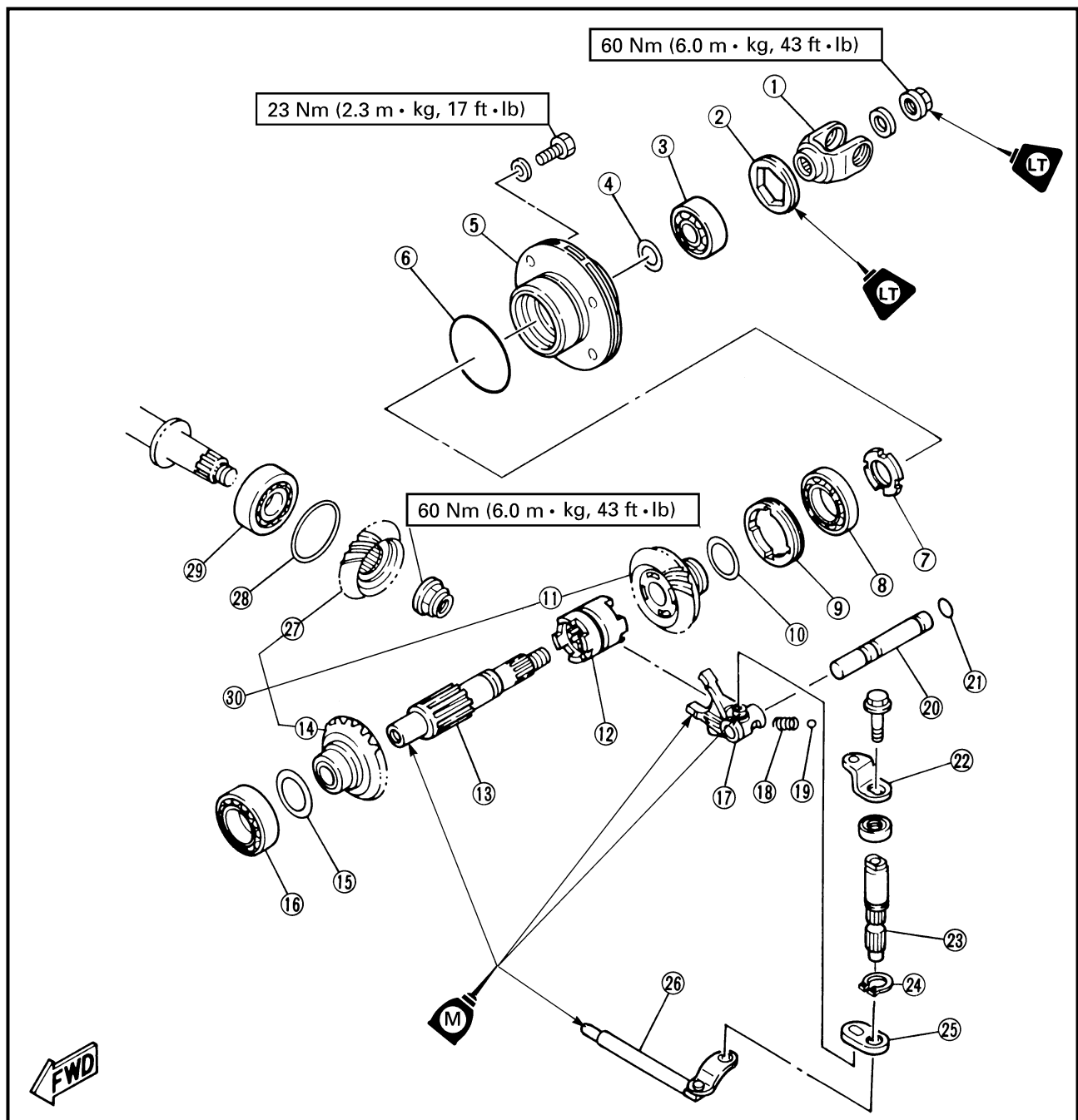


## DRIVE TRAIN

### MIDDLE GEAR SERVICE

#### MIDDLE GEAR

- |                             |                        |                     |
|-----------------------------|------------------------|---------------------|
| ① Universal joint           | ⑪ Reverse gear         | ⑳ O-ring            |
| ② Bearing retainer 1        | ⑫ Dog clutch           | ㉑ Lever             |
| ③ Bearing                   | ⑬ Middle driven shaft  | ㉒ Shift lever shaft |
| ④ Shims                     | ⑭ Driven pinion gear   | ㉓ Circlip           |
| ⑤ Bearing housing           | ⑮ Shims                | ㉔ Shift lever       |
| ⑥ O-ring                    | ⑯ Bearing              | ㉕ Stopper shaft     |
| ⑦ Reverse gear securing nut | ⑰ Shift fork 4         | ㉖ Drive pinion gear |
| ⑧ Bearing                   | ⑱ Spring               | ㉗ Shims             |
| ⑨ Bearing retainer 2        | ㉙ Ball                 | ㉚ Bearing           |
| ⑩ Shims                     | ㉛ Shift fork guide bar | ㉜ Middle gear camp  |



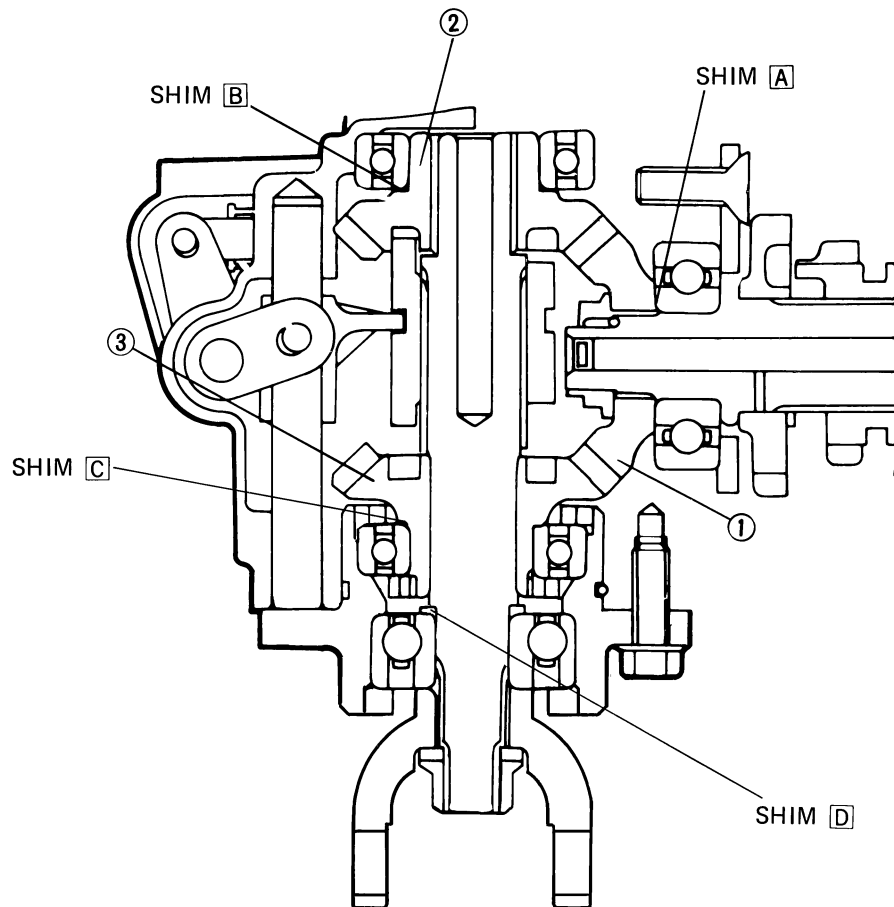
**MIDDLE GEAR SHIMS**

When the crankcase assembly and/or the middle gear comp., etc. are replaced, be sure to adjust the middle gear shim(s).

Refer to the "MIDDLE GEAR SHIM SELECTION" and "MIDDLE GEAR LASH ADJUSTMENT" section.

- ① Drive pinion gear
- ② Driven pinion gear (forward gear)
- ③ Reverse gear

- [A] Drive pinion gear shim
- [B] Driven pinion gear shim
- [C] Reverse gear shim
- [D] Middle driven shaft shim





**REMOVAL****NOTE:**

It is necessary to remove the rear wheel drive assembly and/or engine assembly in order to service the middle gear, refer to the "ENGINE OVERHAUL" section in CHAPTER 4.

**1.Drain:**

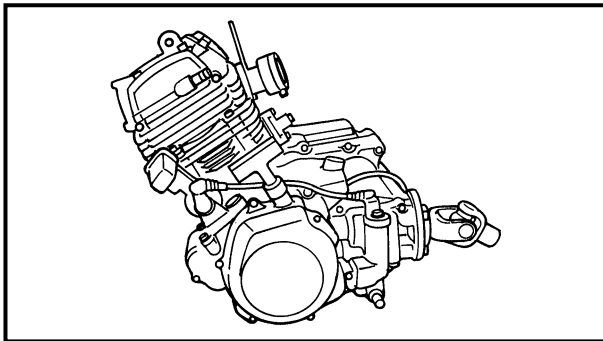
- Engine oil

Refer to the "ENGINE OIL REPLACEMENT" section in CHAPTER 3.

**2.Remove:**

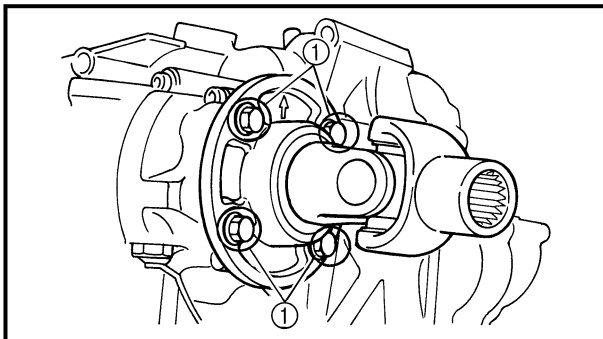
- Seat
- Fuel tank
- Front carrier
- Front bumper
- Front fender
- Rear carrier
- Rear fender

Refer to the "FENDERS AND FUEL TANK-Removal" section in CHAPTER 3.

**3.Remove:**

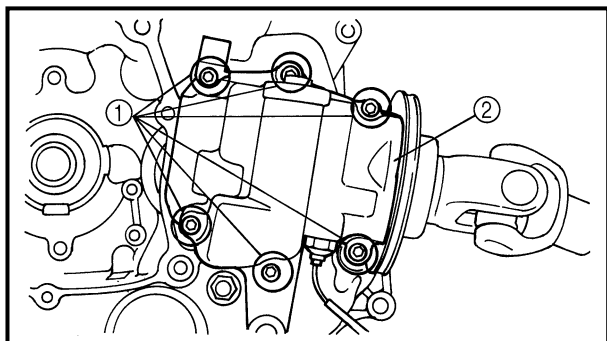
- Engine assembly

Refer to the "ENGINE REMOVAL" section in the CHAPTER 4.

**Middle driven pinion gear****1.Remove:**

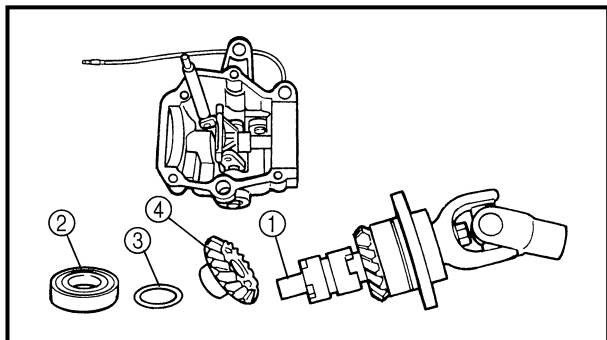
- Bolts ① (bearing housing)

Refer to the "ENGINE DISASSEMBLY - MIDDLE DRIVEN GEAR" section in CHAPTER 4.



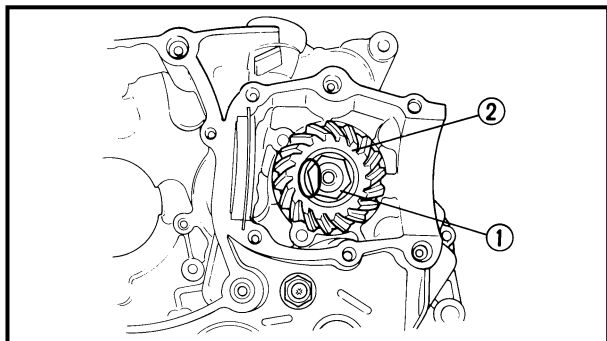
## 2.Remove:

- Bolts ① (middle gear case cover)
- Middle gear case cover ②
- Dowel pins



## 3.Remove:

- Middle driven shaft assembly ①
- Bearing ②
- Shim ③
- Driven pinion gear ④



## Middle drive axle

### 1.Remove:

- Nut ① (middle drive pinion gear)
- Middle drive pinion gear ②

### NOTE:

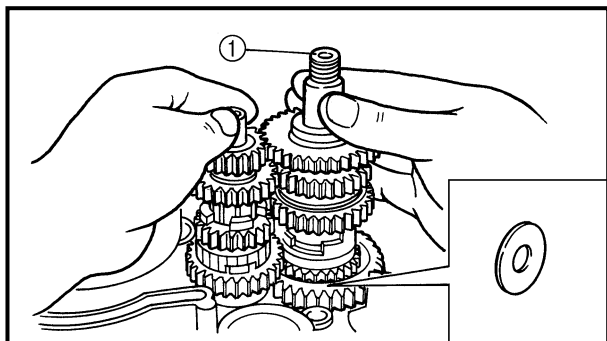
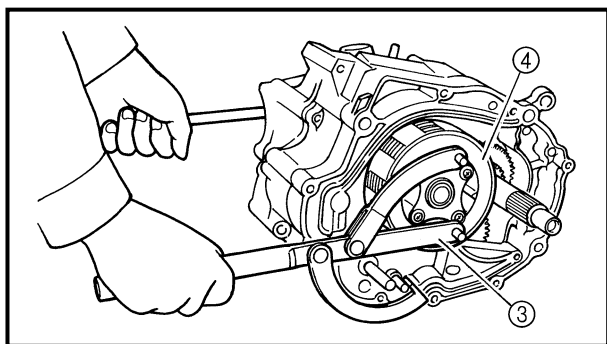
- Flatten the punched portion of the middle drive gear nut using the drift punch.
- Put the engine in 1st, and carry out the operation.

Use the Rotor holder ③ hold the clutch boss ④.



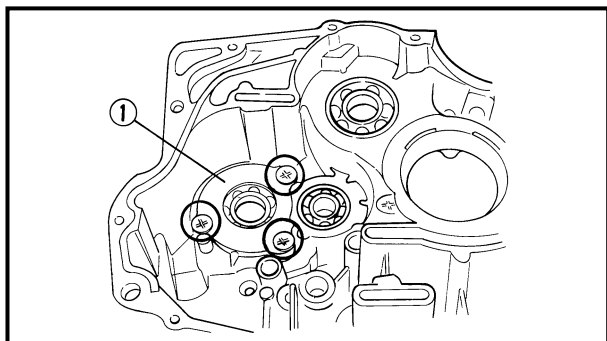
**Rotor holder:**  
P/N. YU-01235, 90890-01235

Refer to the "ENGINE DISASSEMBLY - PRIMARY AND SECONDARY CLUTCHES" section in CHAPTER 4.



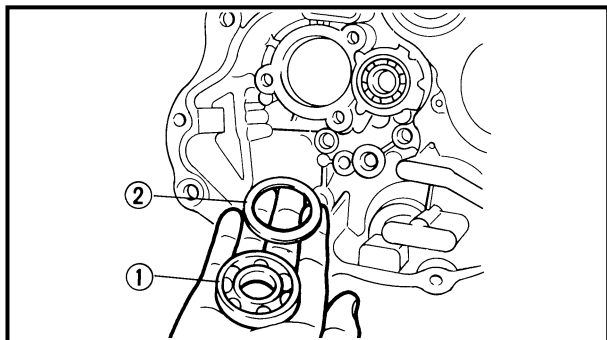
## 2.Remove:

- Middle drive axle assembly ①.
- Refer to the "ENGINE DISASSEMBLY - BALANCER SHAFT, TRANSMISSION AND CRANKSHAFT" section in CHAPTER 4.



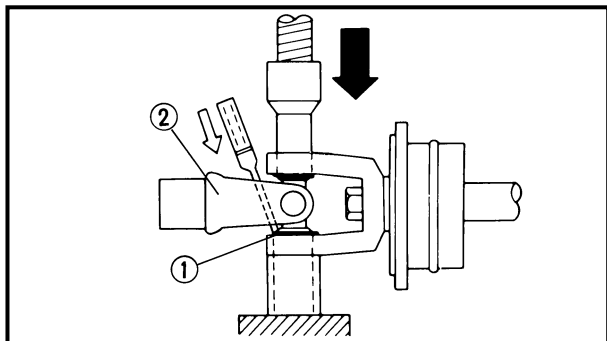
3.Remove:

- Bearing retainers ①
- Use a #40 Torx Driver.



4.Remove:

- Bearing ①
- Shim ②



## DISASSEMBLY

### Middle driven shaft

1.Remove:

- Universal joint

\*\*\*\*\*

#### Removal steps:

- Remove the circlips ①.
- Place the U-joint in a press.
- With a suitable diameter pipe beneath the yoke, press the bearing into the pipe as shown.

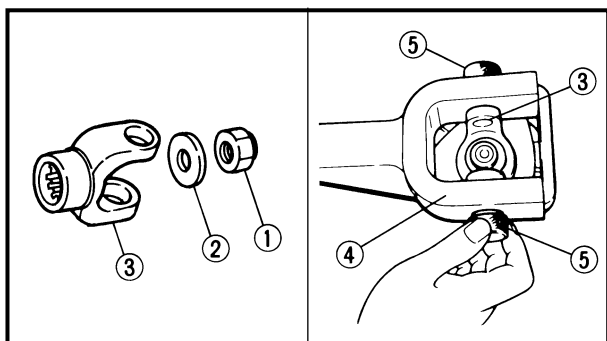
#### NOTE:

It may be necessary to lightly tap the yoke with a punch.

- Repeat the steps for the opposite bearing.
- Remove the yoke and U-joint ②.

#### NOTE:

It may be necessary to lightly tap the yoke with a punch.



2.Remove:

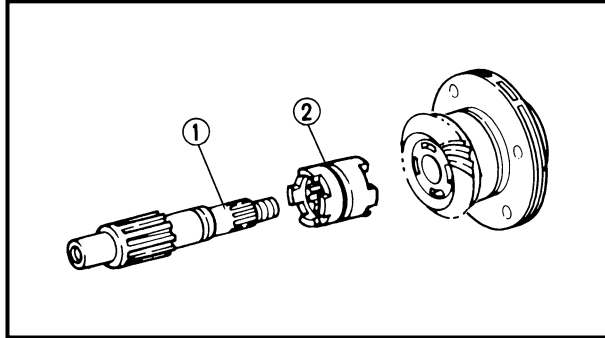
- Nut ① (U-joint)
- Washer ②
- U-joint ③

#### NOTE:

Hold the U-joint ③ by the Universal Joint Holder ④ and Attachment ⑤ to loosen the nut.

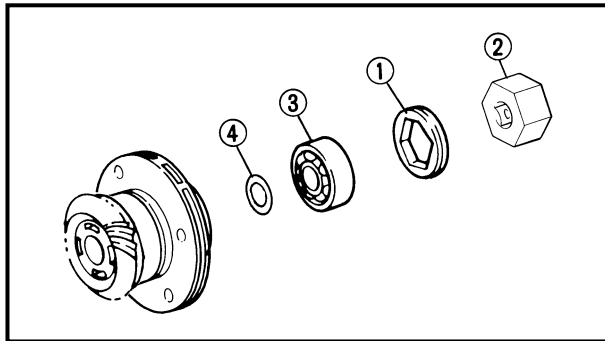


**Universal joint holder:**  
P/N. YM-04062, 90890-04062  
**Attachment:**  
P/N. YM33291, 90890-04096



### 3.Remove:

- Middle driven shaft ①
- Dog clutch ②



### 4.Remove:

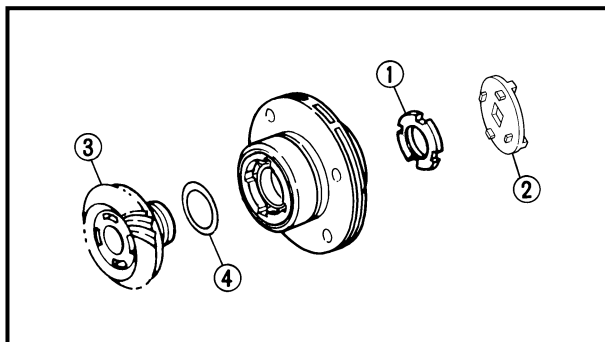
- Bearing retainer ①

### NOTE:

- Use a Bearing retainer wrench ②.



**Bearing retainer wrench 32 mm  
(1.26 in):**  
P/N. YM-33289, 90890-04104



- Bearing ③
- Shim(s) ④

### 5.Remove:

- Reverse gear securing nut ①

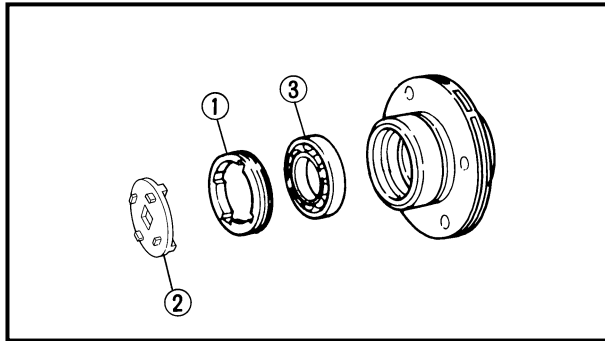
### NOTE:

- The reverse gear securing nut has left-hand threads; turn the nut clockwise to loosen it.
- Use a Ring nut wrench ②.



**Ring nut wrench:**  
P/N. YM-1391, 90890-01391

- Reverse gear ③
- Shim(s) ④



6.Remove:

- Bearing retainer ①

**NOTE:**

- Use a Ring nut wrench ②.



**Ring nut wrench:**

**P/N. YM-1391, 90890-01391**

- Bearing ③

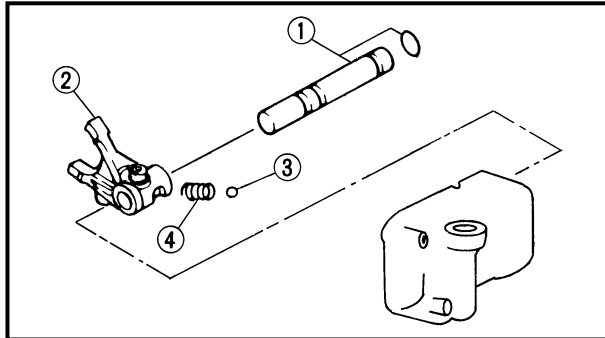
**Shift lever**

1.Remove:

- Shift fork guide bar ①
- Shift fork ②
- Ball ③
- Spring ④

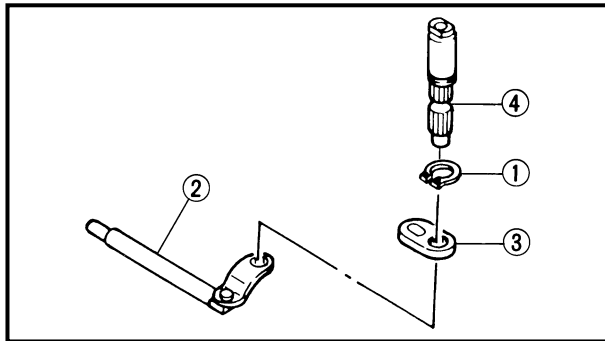
**NOTE:**

When removing the shift fork guide bar, the ball will fall off. Take care not lose the ball.



2.Remove:

- Circlip ①
- Stopper shaft ②
- Shift lever ③
- Shift lever shaft ④



## INSPECTION

1.Inspect:

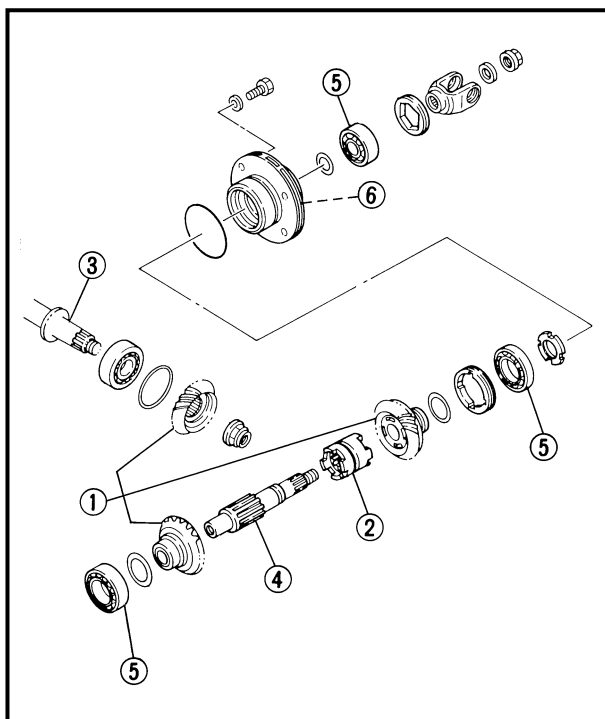
- Gear teeth (all gears) ①  
Pitting/Galling/Wear → Replace.
- Dog clutch ②
- Wear/Cracks/Damage → Replace.
- Middle drive shaft ③
- Middle driven shaft ④  
Bends/Damage → Replace.

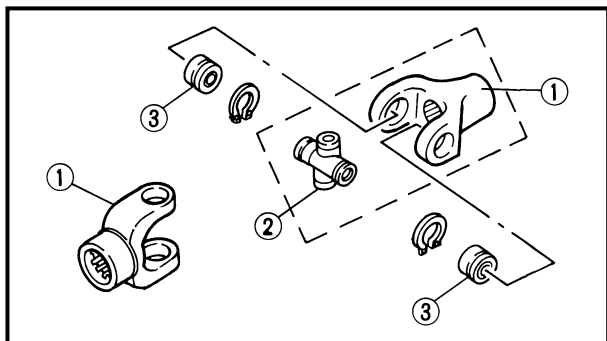
**NOTE:**

When the middle gear and/or middle driven shaft are replaced, be sure to adjust the middle gear shim(s), refer to the "MIDDLE GEAR SHIM SELECTION" section.

2.Inspect:

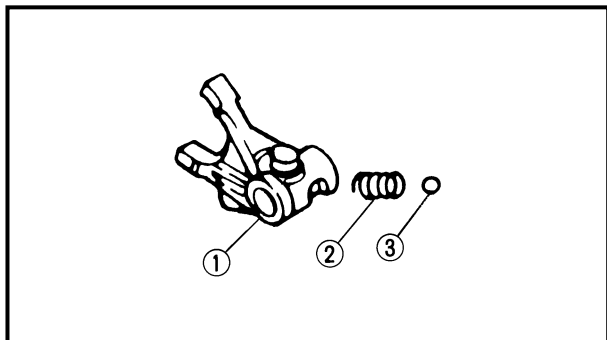
- Bearings ⑤  
Pitting/Damage → Replace.
- Oil seal ⑥  
Wear/Damage → Replace.





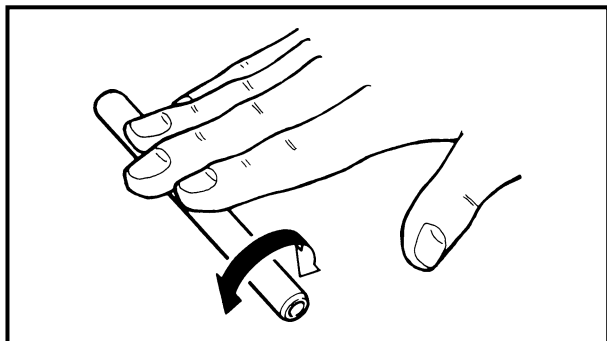
## 3.Check:

- Universal joints ①
  - Yoke ②
  - Bearings ③
- Wear/Cracks/Damage → Replace.



## 4.Inspect:

- Shift fork 4 ①
- On the dog clutch and shift lever contact surfaces.  
Wear/Chafing/Bends/Damage → Replace.
- Spring ②
- Wear/Damage → Replace.
- Ball (stopper) ③
- Wear/Damage/Scratches → Replace.

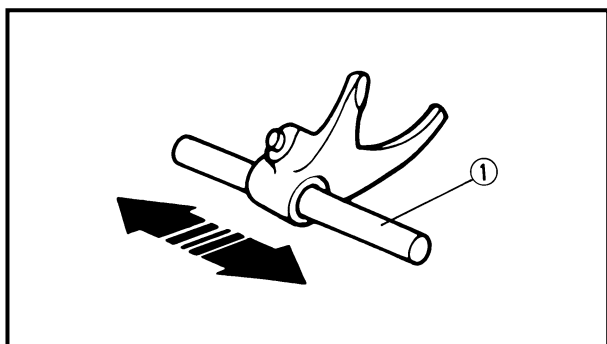


## 5.Inspect:

- Guide bar
- Roll the guide bar on a flat surface.  
Bends → Replace.

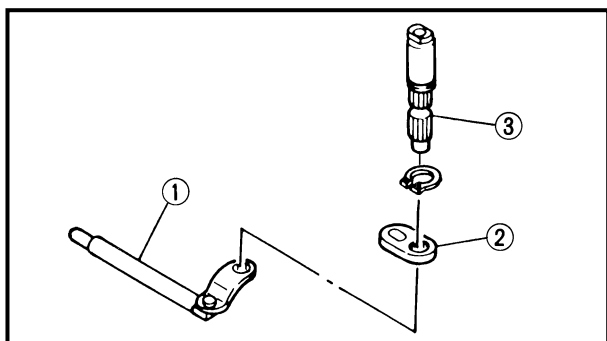
## ⚠ WARNING

**Do not attempt to straighten a bent guide bar.**



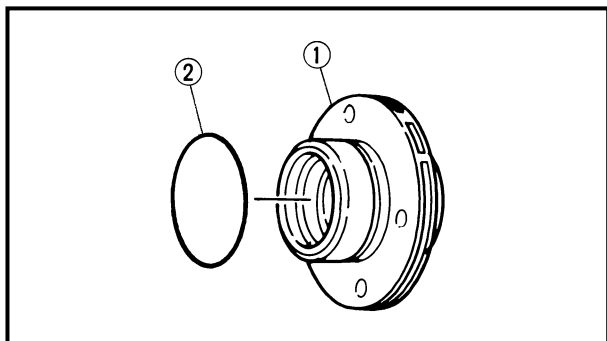
## 6.Check:

- Shift fork movement
- On its guide bar ①.  
Unsmooth operation → Replace fork and/or guide bar.



## 7.Inspect:

- Stopper shaft ①
  - Shift lever ②
  - Shift lever shaft ③
- Bends/Cracks/Damage → Replace.

**8. Inspect:**

- Bearing housing ①  
Cracks/Damage → Replace bearing housing assembly.
- O-ring ②  
Wear/Damage → Replace.

**NOTE:**

When the bearing housing assembly is replaced, be sure to adjust the middle gear shim(s), refer to the "MIDDLE GEAR SHIM SELECTION" section.

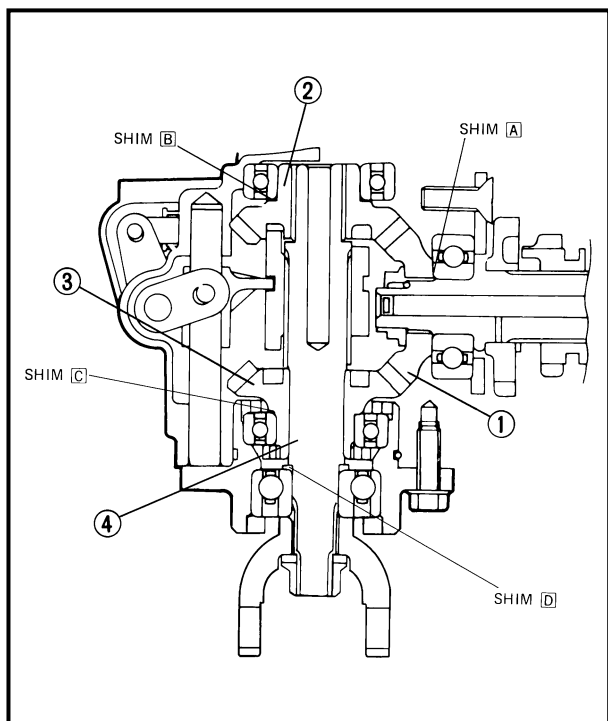
**MIDDLE GEAR SHIM SELECTION**

Install the crankcase, middle gears and middle driven shaft by using shim(s) with their respective thickness(es) calculated from the numbers specified on the following parts.

- Crankcase
- Drive pinion gear
- Driven pinion gear
- Reverse gear
- Bearing housing
- Middle driven shaft

Be sure to adjust the middle gear shim(s), when the following parts replaced.

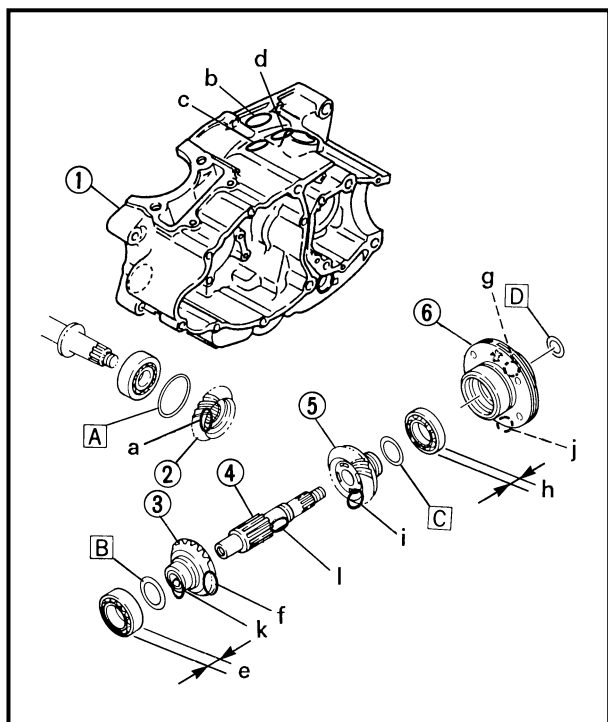
- Crankcase
- Drive pinion gear
- Driven pinion gear
- Reverse gear
- Bearing housing
- Middle driven shaft



## Shim location

- A** = Drive pinion gear shim
- B** = Driven pinion gear shim
- C** = Reverse gear shim
- D** = Middle driven shaft shim

- ① Drive pinion gear
- ② Driven pinion gear
- ③ Reverse gear
- ④ Middle driven shaft



Replaced parts	Adjust shim			
Crankcase	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
Drive pinion gear	<b>A</b>			
Driven pinion gear		<b>B</b>		<b>D</b>
Reverse gear			<b>C</b>	<b>D</b>
Bearing housing			<b>C</b>	<b>D</b>
Middle driven shaft				<b>D</b>

- A** = a - b
- B** = c - d - e - f
- C** = d - g - h - i
- D** = j + c - e - **B** - k - l - 0.25

- ① Crankcase (left)
- ② Drive pinion gear
- ③ Driven pinion gear
- ④ Middle driven shaft
- ⑤ Reverse gear
- ⑥ Bearing housing

## NOTE:

- The gear back lash should be:  
0.1 mm ~ 0.2 mm forward  
0.1 mm ~ 0.25 mm rear
- Adjust the middle driven shaft in order to obtain the following thrust free play.  
0.1 mm ~ 0.4 mm



\*\*\*\*\*

## Middle gear shims selection steps:

### Shim selection $\boxed{A}$

- When the crankcase and/or the drive pinion gear are replaced, be sure to adjust the drive pinion gear shim  $\boxed{A}$ .
- To find drive pinion gear shim thickness "A" use following formula:

### Drive pinion gear shim thickness:

$$\boxed{A} = \textcircled{a} - \textcircled{b}$$


- $\textcircled{a}$  = The stamped number on the drive pinion gear is either added to or subtracted from "42".
- $\textcircled{b}$  = The stamped number on the crankcase is added to from "41".

### NOTE:

All stamped numbers are in hundredths of a mm.

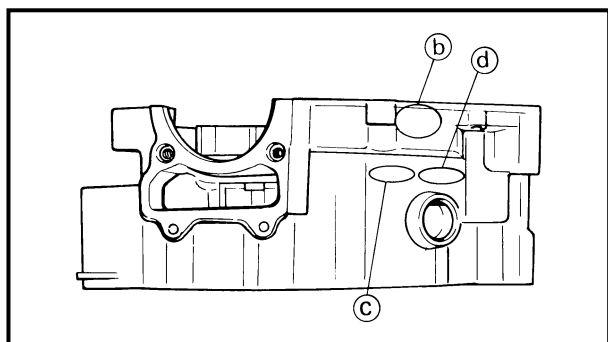
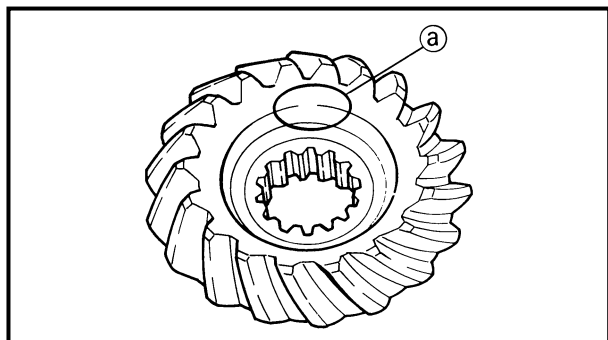
### Example:

- 1) If the drive pinion gear is stamped "+02"  
....  $\textcircled{a} = 42 + 0.02 = 42.02$
- 2) If the crankcase is stamped "45"  
.....  $\textcircled{b} \text{ is } = 41 + 0.45 = 41.45$
- 3) Therefore, shim thickness  $\boxed{A}$  is,  
 $\boxed{A} = 42.02 - 41.45 = 0.57 \text{ mm}$
- 4) Shim sizes are supplied in the following thickness:

	Drive pinion gear shim	
Thickness (mm)	0.15	0.40
	0.20	0.50
	0.30	

Because shims can only be selected in 0.05 mm increments, round off hundredths digit and select appropriate shim(s).

Hundredths	Round value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10



In the example above, the calculated shim thickness is 0.57 mm. The chart instructs you, however, to round off the 7 to 5, then shim thickness is 0.55 mm.

**Shim selection** B

- When the crankcase and/or the driven pinion gear are replaced, be sure to adjust the driven pinion gear shim B.
- To find driven pinion gear shim thickness "B" use following formula:


**Driven pinion gear shim thickness:**

B = C - d - e - f

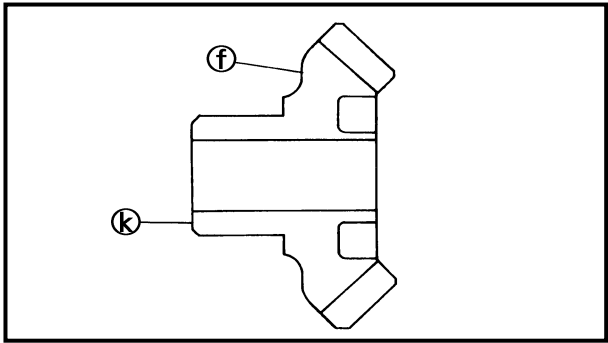
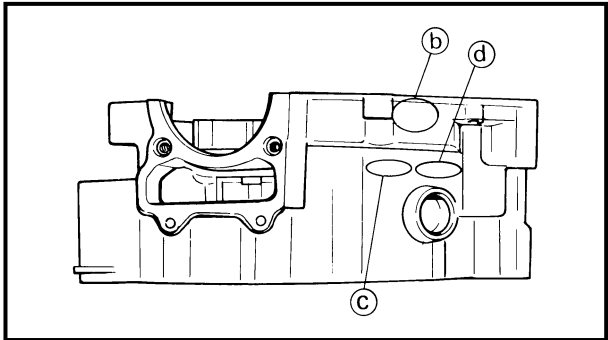
- C= The stamped number on the crankcase is added to from "110".
- d= The stamped number on the crankcase is subtracted from "59".
- e= Bearing (driven pinion gear) thickness (considered constant) "13.00 mm".
- f= The stamped number on the driven pinion gear is added to or subtracted from "37.5".

Example:

- 1) If the drive pinion gear is stamped "45"  
..... C = 110 + 0.45 = 110.45
- 2) If the crank case is stamped "-02"  
..... d = 59 - 0.02 = 58.98
- 3) If the driven pinion gear is stamped "+02"  
..... f = 37.5 + 0.02 = 37.52
- 4) Therefore, shim thickness B is,  
B = 110.45 - 58.98 - 13.00 - 37.52 = 0.95 mm
- 5) Shim sizes are supplied in following thickness:

	Drive pinion gear shim	
Thickness (mm)	0.15	0.40
	0.20	0.50
	0.30	

Because shims can only be selected in 0.05 mm increments, round off hundredths digit and select appropriate shim(s).



Hundredths	Round value
0, 1	0
2, 3	3
4, 5, 6	5
7, 8	8
9	10

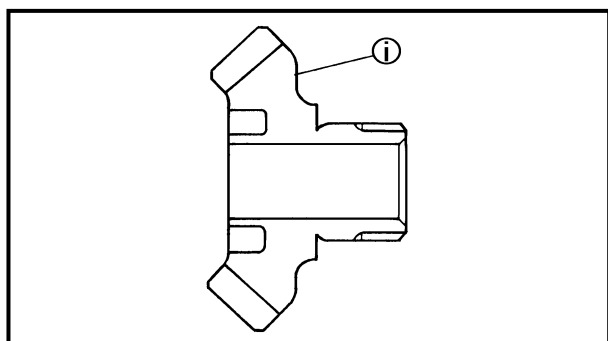
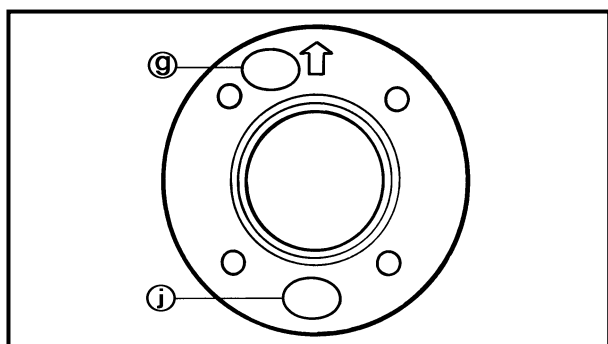
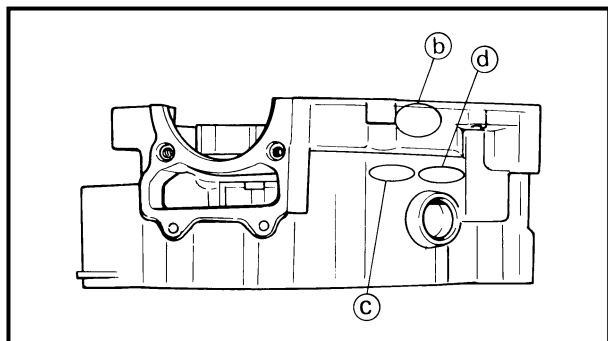
In the example above, the calculated shim thickness is 0.95 mm. The chart instructs you, however, to round off the 5 to 5, then shim thickness is 0.95 mm.

## Shim selection C

- When the crankcase, reverse gear and/or bearing housing are replaced, be sure to adjust the reverse gear shim C.
- To find reverse gear shim thickness "C" use following formula:

### Reverse gear shim thickness:


$$\text{C} = \text{d} - \text{g} - \text{h} - \text{i}$$



- ① = The stamped number on the crankcase is subtracted from "59".
- ② = The stamped number on the bearing housing is subtracted from "7.5".
- ③ = Bearing (reverse gear) thickness (considered constant) "12.00 mm".
- ④ = The stamped number on the reverse gear is added to or subtracted from "39".

### Example:

- 1) If the crank case is stamped "-02".  
..... ① = 59 - 0.02 = 58.98
- 2) If the bearing, hauging is stamped "-01".  
..... ② = 7.5 - 0.01 = 7.49
- 3) If the reverse gear is stamped "-02".  
..... ④ = 39 - 0.02 = 38.98
- 4) Therefore, shim thickness C is,  
 $\text{C} = 58.98 - 7.49 - 12.00 - 38.98 = 0.51 \text{ mm}$
- 5) Shim sizes are supplied in following thickness:


	Reverse gear shim	
Thickness (mm)	0.15	0.40
	0.20	0.50
	0.30	

Because shims can only be selected in 0.05 mm increments, round off hundredths digit and select appropriate shim(s).

Hundredths	Round value
0, 1	0
2, 3	3
4, 5, 6	5
7, 8	8
9	10

In the example above, the calculated shim thickness is 0.51 mm. The chart instructs you, however, to round off the 1 to 0, then shim thickness is 0.50 mm.

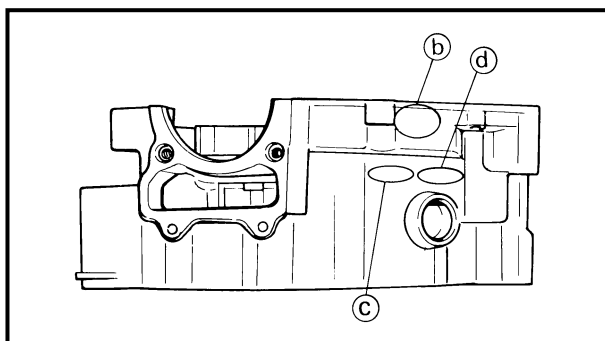
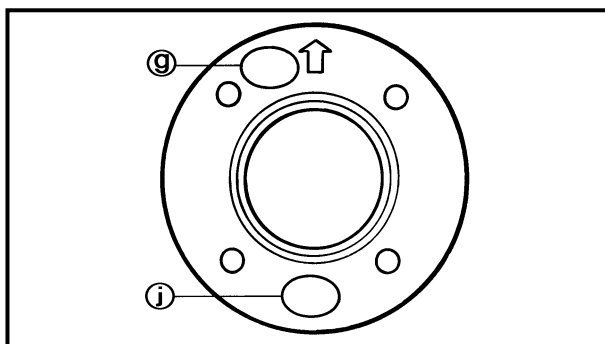
#### Shim selection

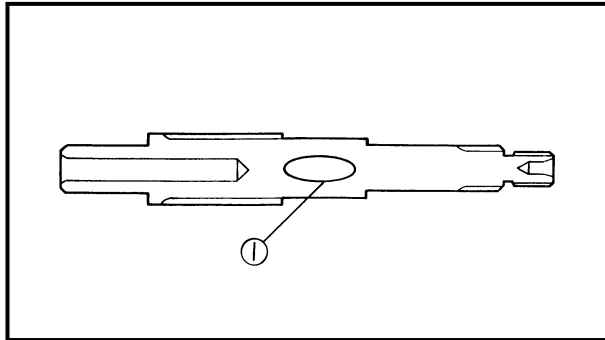
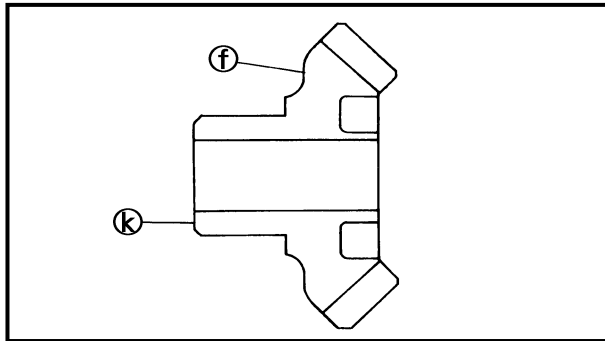
- When the crankcase, driven pinion gear, reverse gear, bearing housing and/or middle driven shaft are replaced, be sure to adjust the middle driven shaft shim .
- To find reverse gear shim thickness "D" use following formula:

#### Middle driven gear thickness:

$$D = j - c - e - B - k - l - 0.25$$


- j = The stamped number on the bearing hausing is subtracted from "1".
- c = The stamped number on the crankcase is added to from "110".
- e = Bearing (driven pinion gear) width "13.00".
- k = The stamped number on the driven pinion gear (forward gear) is subtracted from "14.5".
- l = The stamped number on the middle driven shaft is either added to or subtracted from "80.5".





Example:

- 1) If the bearing housing is stamped "-03".  
.....  $j = 1 - 0.03 = 0.97$
- 2) If the crankcase is stamped "45"  
.....  $c = 110 + 0.45 = 110.45$
- 3) If the pinion gear is stamped "-02"  
.....  $k = 14.5 - 0.02 = 14.48$
- 4) If the middle drive shaft is stamped "03"  
.....  $l = 80.5 + 0.03 = 80.53$
- 5) Therefore, shim thickness  $D$  is,  
 $D = 0.97 + 110.45 - 13.00 - 0.95 - 14.48 - 80.53 - 0.25 = 2.21 \text{ mm}$
- 6) Shim sizes are supplied in following thickness:

	Middle driven gear shim	
Thickness (mm)	1.0	1.1
	1.2	1.3
	1.4	1.5
	1.6	1.7
	1.8	1.9

Because shims can only be selected in 0.10 mm increments, round off hundredths digit and select appropriate shim(s).

Hundredths	Round value
0, 1, 2, 3, 4	0
5, 6, 7, 8, 9	10

If the example above, the calculated shim thickness 2.21 mm. The chart instructs you, however, to round off the 1 to 0, then shim thickness is 2.20 mm.

\*\*\*\*\*

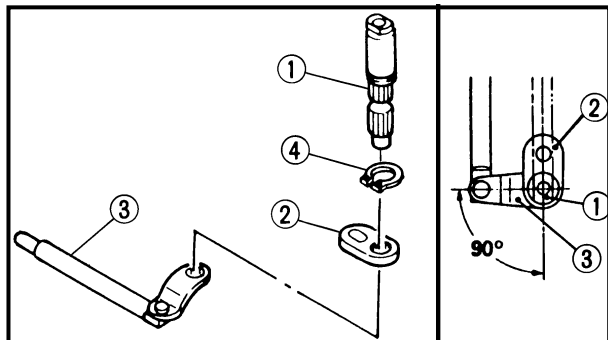
**ASSEMBLY**

Reverse the "DISASSEMBLY" procedures.  
Note the following points.

**Middle driven shaft**

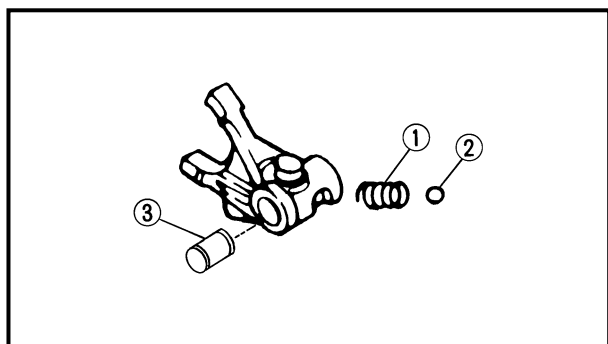
1. Apply:

- Lithium base grease  
To the oil seal and O-ring.



2. Install:

- Shift lever shaft ①
- Shift lever ②
- Stopper shaft ③
- Circlip ④



3. Install:

- Spring ① (to shift fork 4)
- Ball ②

**NOTE:**

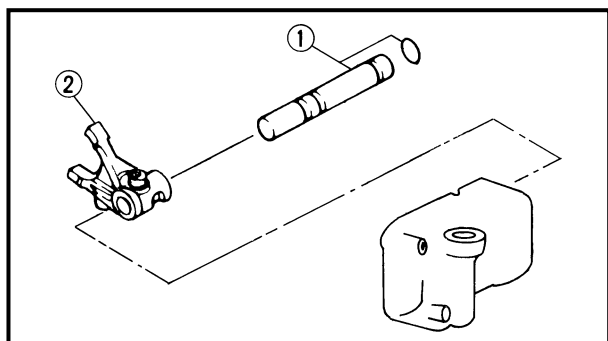
When installing the shift fork 4 onto the shift fork guide bar, place a dowel pin ③ (used for a crank case cover) to hold the ball and spring in place.

4. Lubricate:

- Apply the molybdenum disulfide oil to shift fork inner diameter and to the pin.



**Molybdenum disulfide oil**

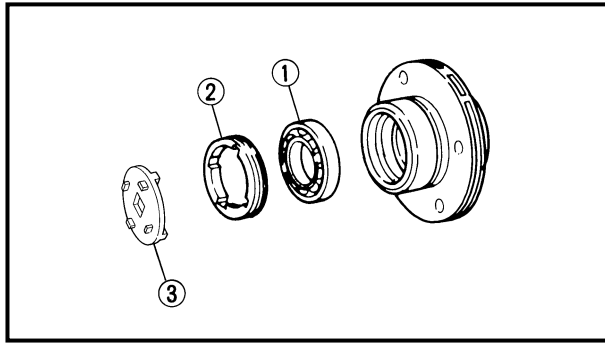


5. Install:

- Shift fork guide bar ① (with O-ring)
- Shift fork 4 ②

**NOTE:**

- Remove the dowel pin from the shift fork 4.
- Make sure that the shift fork performs smoothly.



## 6. Install:

- Bearing ① (to bearing housing)
- Bearing retainer ②

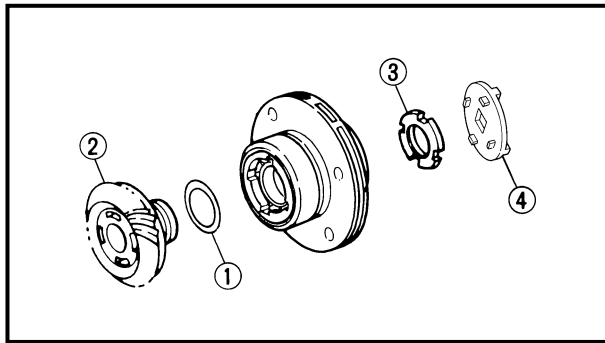
**NOTE:**

- Use a Ring nut wrench ③.

**Ring nut wrench:****P/N. YM-1391, 90890-01391**

## 7. Tighten:

- Bearing retainer

**Bearing retainer:****60 Nm (6.0 m • kg, 43 ft • lb)**

## 8. Install:

- Shim(s) ①
- Reverse gear ②
- Reverse gear securing nut ③

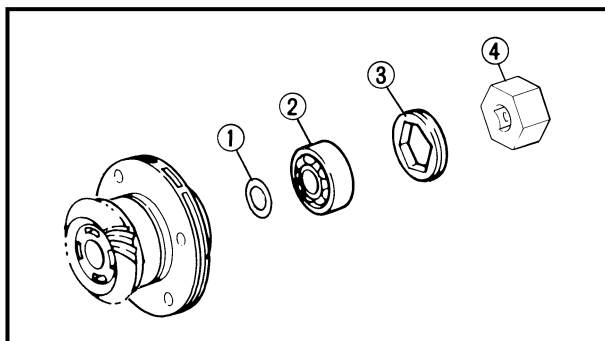
**NOTE:**

- The reverse gear securing nut has left-hand threads, turn the nut counterclockwise to tighten it.
- Use a Ring nut wrench ④.

**Ring nut wrench:****P/N. YM-1391, 90890-01391**

## 9. Tighten:

- Reverse gear securing nut

**Reverse gear securing nut:  
(LEFT-HAND-THREADS)****60 Nm (6.0 m • kg, 43 ft • lb)**

## 10. Install:

- Shim(s) ①
- Bearing ②
- Bearing retainer ③

**NOTE:**

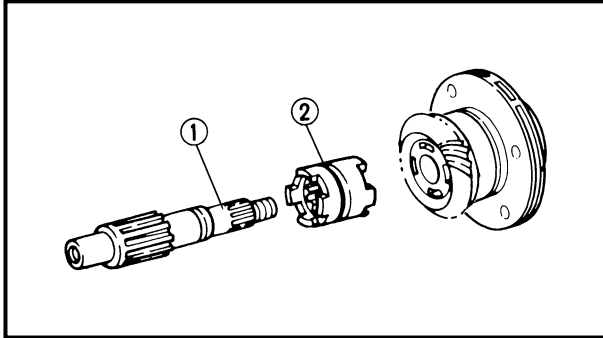
- Use a Bearing retainer wrench ④.

**Bearing retainer wrench:****P/N. YM-33289, 90890-04104**

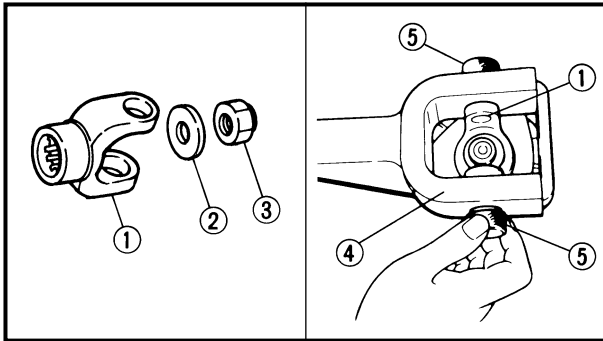
- 11.Tighten:
- Bearing retainer



**Bearing retainer:**  
60 Nm (6.0 m • kg, 43 ft • lb)  
Use LOCTITE®



- 12.Install:
- Middle driven shaft ①
  - Dog clutch ②



- 13.Install:
- U-joint ①
  - Washer ②
  - Nut ③ (U-joint)

**NOTE:** Hold the U-joint ① by the Universal Joint Holder ④ and Attachment ⑤, and tighten the U-joint securing nut to specification.

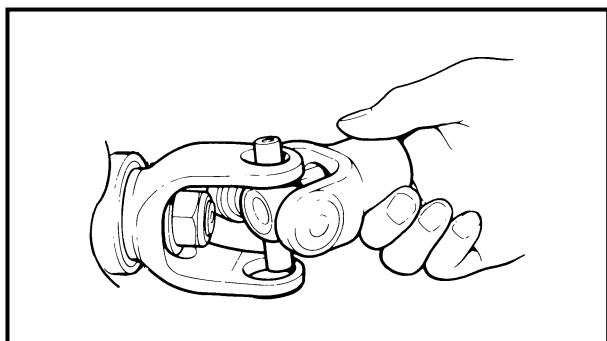


**Universal joint holder:**  
P/N. YM-04062, 90890-04062  
**Attachment:**  
P/N. YM-33291, 90890-04096



**Nut (U-Joint):**  
60 Nm (6.0 m • kg, 43 ft • lb)  
Use LOCTITE®





- 14.Install
- Universal joint

\*\*\*\*\*

## Installation steps:

- Install the opposite yoke into the U-joint.
- Apply the "Wheel bearing grease" to the bearings.
- Install the bearing ① onto the yoke.

## CAUTION:

**Check each bearing. The needles can easily fall out of their races. Slide the yoke back and forth on the bearings; the yoke will not go all the way onto a bearing if a needle is out of place.**

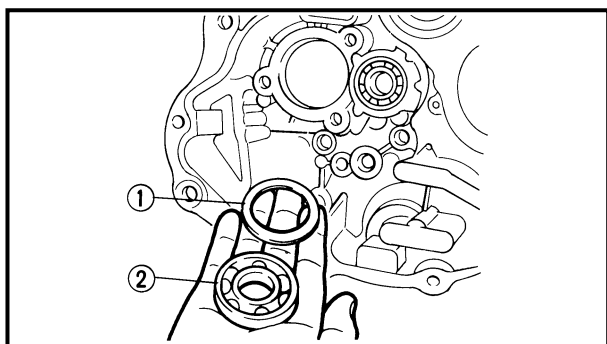
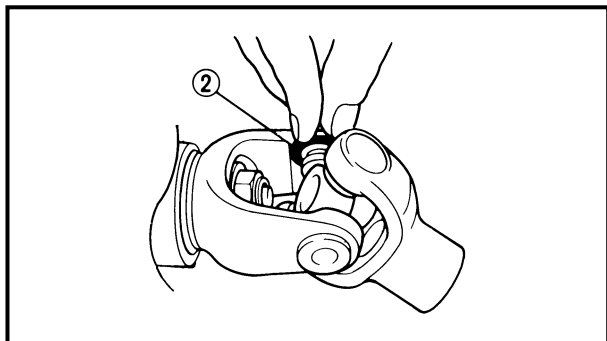
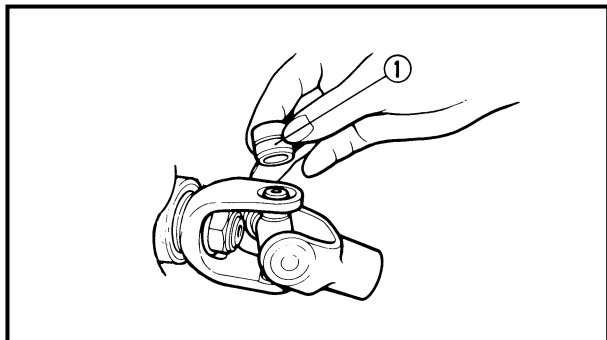
- Press each bearing into the U-joint using a suitable socket.

## NOTE:

Bearing must be inserted far enough into U-joint so that circlip can be installed.

- Install the circlips ② into the groove of each bearing.

\*\*\*\*\*



## Middle drive axle

### 1.Install:

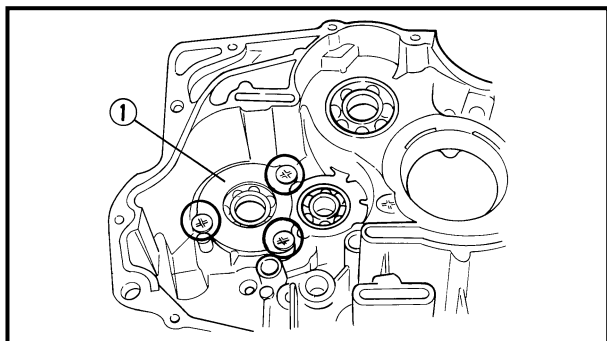
- Bearing ①
- Shim ②

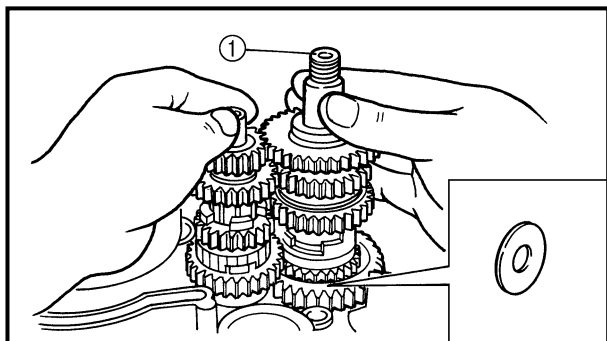
### 2.Install:

- Bearing retainers ①
- Use a #40 Torx Driver.



**Bearing retainers:**  
25 Nm (2.5 m • kg, 18 ft • lb)  
Use LOCTITE®

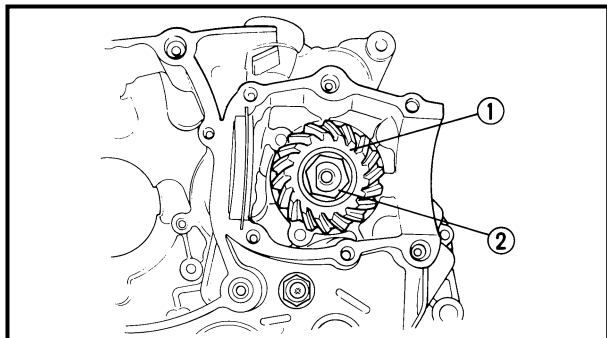




## 3.Install:

- Middle drive axle assembly ①

Refer to the "ENGINE ASSEMBLY AND ADJUSTMENT-CRANK SHAFT, TRANSMISSION AND BALANCER SHAFT" section in CHAPTER 4.



## 4.Install:

- Middle drive pinion gear ①

- Nut ②

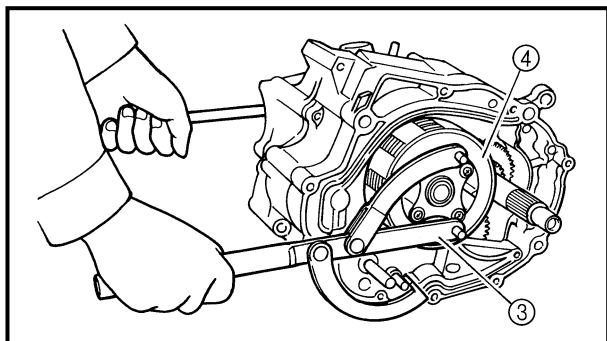


**Nut (middle drive pinion gear):**  
60 Nm (6.0 m • kg, 43 ft • lb)

Use the Rotor Holder ③ to hold the clutch boss ④.



**Rotor holder:**  
P/N. YU-01235, 90890-01235

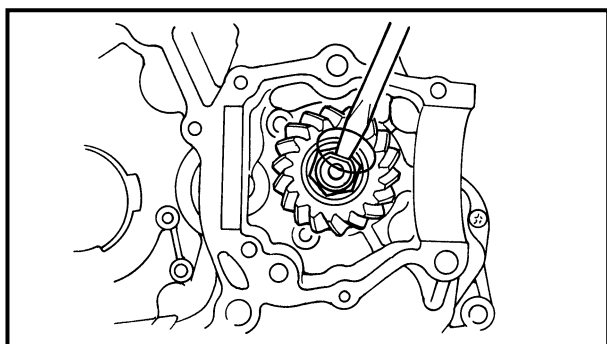


## NOTE:

Put the engine in 1st, and carry out the operation.

## 5.Check:

- Middle drive axle, transmission and shifter operation
- Unsmooth operation → Repair.

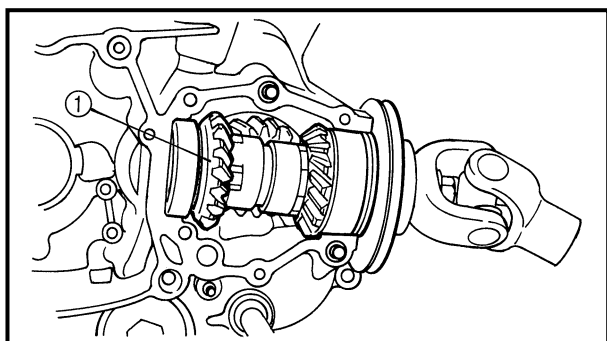


## 6.Lock the thread with drift punch.

## ⚠ WARNING

**Always use a new nut.**

Refer to the "ENGINE ASSEMBLY AND ADJUSTMENT – PRIMARY AND SECONDARY CLUTCHES" section in CHAPTER 4.

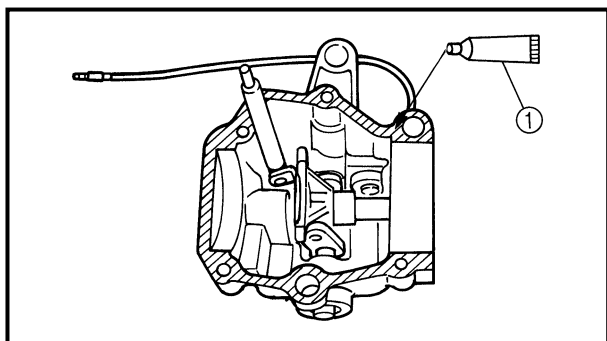


## Middle driven pinion gear

### 1.Install:

- Middle driven pinion gear assembly ①

Refer to the "ENGINE ASSEMBLY MIDDLE DRIVEN PINION GEAR" section in CHAPTER 4.



## 2. Apply:

- Sealant ①

To the mating surface of both case halves.



**Sealant (Quick Gasket)®**  
**P/N. ACC-QUICK-GS-KT**  
**Yamaha bond No. 1215**  
**P/N. 90890-85505**

## 3. Install:

- Dowel pins
- Middle gear case cover ②

## NOTE:

Before installing the middle gear case cover onto the crankcase, shift the gear into "FORWARD".

## 4. Tighten:

- Bolts ③ (middle gear case)



**Bolts (middle gear case cover):**  
**10 Nm (1.0 m • kg, 7.2 ft • lb)**

## 5. Tighten:

- Bolts ① (bearing housing)



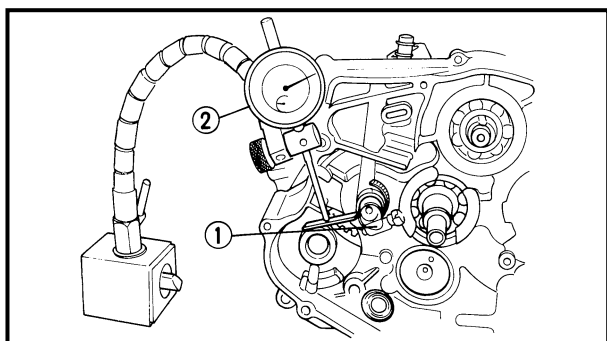
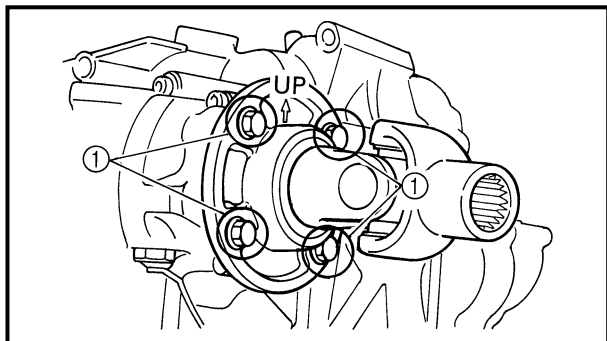
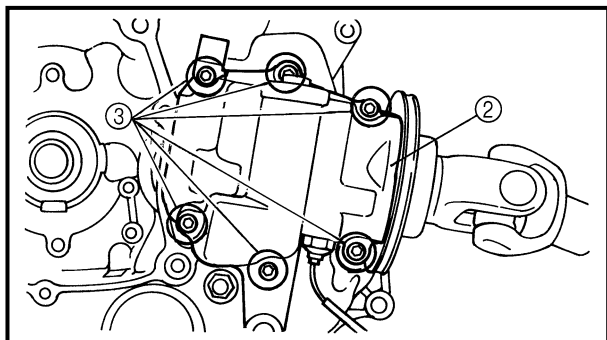
**Bolts (bearing housing):**  
**23 Nm (2.3 m • kg, 17 ft • lb)**

## NOTE:

When installing the bearing housing onto the crankcase, make sure that the arrow sign is facing upwards.

## 6. Check:

- Middle driven shaft operation  
 Unsmooth operation → Repair.



## MIDDLE GEAR LASH ADJUSTMENT

## NOTE:

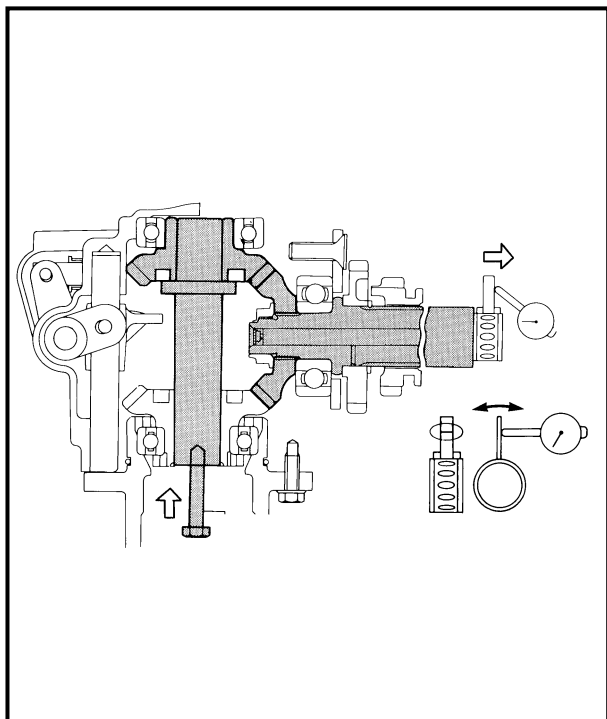
When measuring backlash, tighten all securing bolts (middle gear case cover bearing housing) with specified torque.

## 1. Attach:

- Gear lash measurement tool ①
- Dial gauge ②



**Gear lash measurement tool:**  
**P/N. YM-01231, 90890-01231**  
**Dial gauge:**  
**P/N. YM-03097, 90890-03097**



## 2.Shift:

- Drive select lever  
For forward drive.

## 3.Measure:

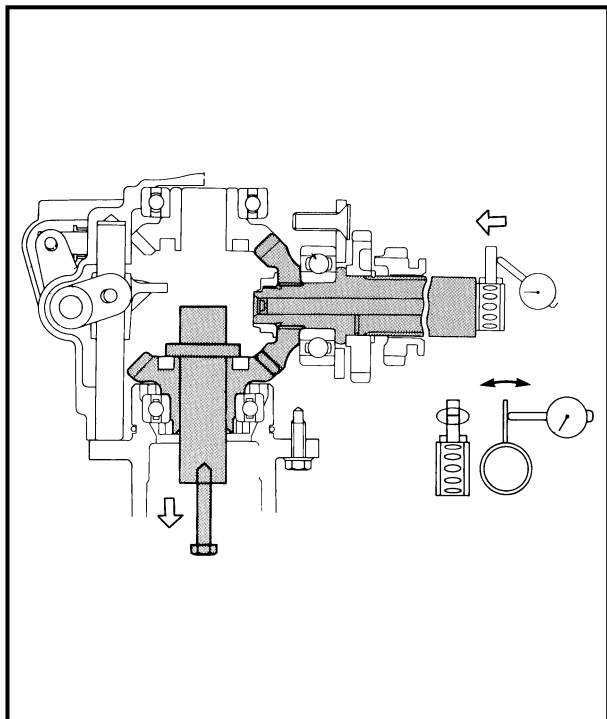
- Gear lash  
Gently rotate the middle drive axle from engagement to engagement.  
Over specified limit → Repair.



**Middle driven gear lash:**  
(using measurement tool):  
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

**NOTE:**

Measure the gear lash at 4 positions. Rotate the shaft 90° each time.



## 4.Shift:

- Drive select lever  
For reverse drive

## 5.Repeat step 3.

Over specified limit → Repair.



**Reverse gear lash:**  
0.1 ~ 0.25 mm (0.004 ~ 0.010 in)

**INSTALLATION**

Reverses the "REMOVAL" procedures.  
Note the following points.

## 1.Remounting engine:

Refer to the "ENGINE ASSEMBLY AND ADJUSTMENT - REMOUNTING ENGINE" section in CHAPTER 4.

## 2.Install:

- Rear wheel drive assembly and swingarm  
Refer to “REMOUNTING ENGINE” section in the CHAPTER 4.

## 3.Adjust:

- Rear brake  
Refer to “REAR BRAKE LEVER AND PEDAL ADJUSTMENT” section in the CHAPTER 3.

## 4.Install:

- Rear fender
- Rear carrier
- Front fender
- Front bumper
- Front carrier
- Fuel tank
- Seat

Refer to the “FENDERS AND FUEL TANK-Installation” section in CHAPTER 3.

## 5.Fill:

- Crankcase

	<b>Total amount:</b> <b>1.8 L (1.6 Imp qt, 1.9 US qt)</b>
--	--

Refer to the “ENGINE OIL REPLACEMENT” section in CHAPTER 3.

## 6.Check:

- “REVERSE” indicator light operation  
Poor operation → Repair.

- ① Bearing housing
- ② O-ring
- ③ Oil seal
- ④ Bearing
- ⑤ Ring gear shim
- ⑥ Ring gear
- ⑦ Thrust washer

- ⑧ Bearing
- ⑨ Oil seal
- ⑩ Bearing
- ⑪ Drive pinion gear
- ⑫ Final drive gear shim
- ⑬ Bearing
- ⑭ Bearing retainer

- ⑮ O-ring
- ⑯ Oil seal
- ⑰ Collar
- ⑱ Drive shaft
- ⑲ Circlip
- ⑳ Universal joint
- ㉑ Bearing



## TROUBLESHOOTING

The following conditions may indicate damage drive train components:

Symptoms	Possible causes
1.A pronounced hesitation or “jerky” movement during acceleration, deceleration, or sustained speed. (this must not be confused with engine surging or transmission characteristics.)	A. Bearing damage.
	B. Improper gear lash.
	C. Gear tooth damage.
2.A “rolling rumble” noticeable at low speed; a high-pitched “whine”; a “clank” from a drive train component or area.	D. Broken drive shaft.
	E. Broken gear teeth.
3.A locked-up condition of the drive train mechanism, no power transmitted from engine to rear wheel.	F. Seizure due to lack of lubrication.
	G. Small foreign object lodged between moving parts.

### NOTE:

Areas A, B, and C above may be extremely difficult to diagnose. The symptoms are quite subtle and difficult to distinguish from normal machine operating noise. If there is reason to believe these components are damaged, remove the components for specific inspection.

## Inspection notes

1. Investigate any unusual noises

\*\*\*\*\*

**The following “Noises” may indicate a mechanical problem:**

- A “rolling rumble” noise during coasting, acceleration, or deceleration. The noise increases with rear wheel speed, but it does not increase with higher engine or transmission speeds.

Diagnosis: Possible wheel bearing damage.

- A “whining” noise that varies with acceleration and deceleration.

Diagnosis: Possible incorrect reassembly, too-little gear lash.

## CAUTION:

**Too-little gear lash is extremely destructive to the gear teeth. If a test ride following reassembly indicates this condition, stop riding immediately to minimize gear damage.**

- A slight “thunk” evident at low speed operation.

This noise must be distinguished from normal machine operation.

Diagnosis: Possible broken gear teeth.

## ⚠ WARNING

**Stop riding immediately if broken gear teeth are suspected. This condition could result in a locking-up of the shaft drive assembly, causing loss of control of the ATV and possible injury to the rider.**

\*\*\*\*\*

2. Inspect:

- Drained oil

Drain plug shows large amount of metal.

Particles → Check bearing for seizure.

## NOTE:

A small amount of metal particles in the oil is normal.



## 3. Inspect:

- Oil leakage

By the following inspection steps.

\*\*\*\*\*

### Oil leakage inspection steps:

- Clean the entire machine thoroughly, then dry it.
- Apply a leak-localizing compound or dry powder spray to the shaft drive.
- Road test the machine long enough to locate the leak.

Leakage → Inspect component housing, gasket, and/or seal for damage.

Damage → Replace component.

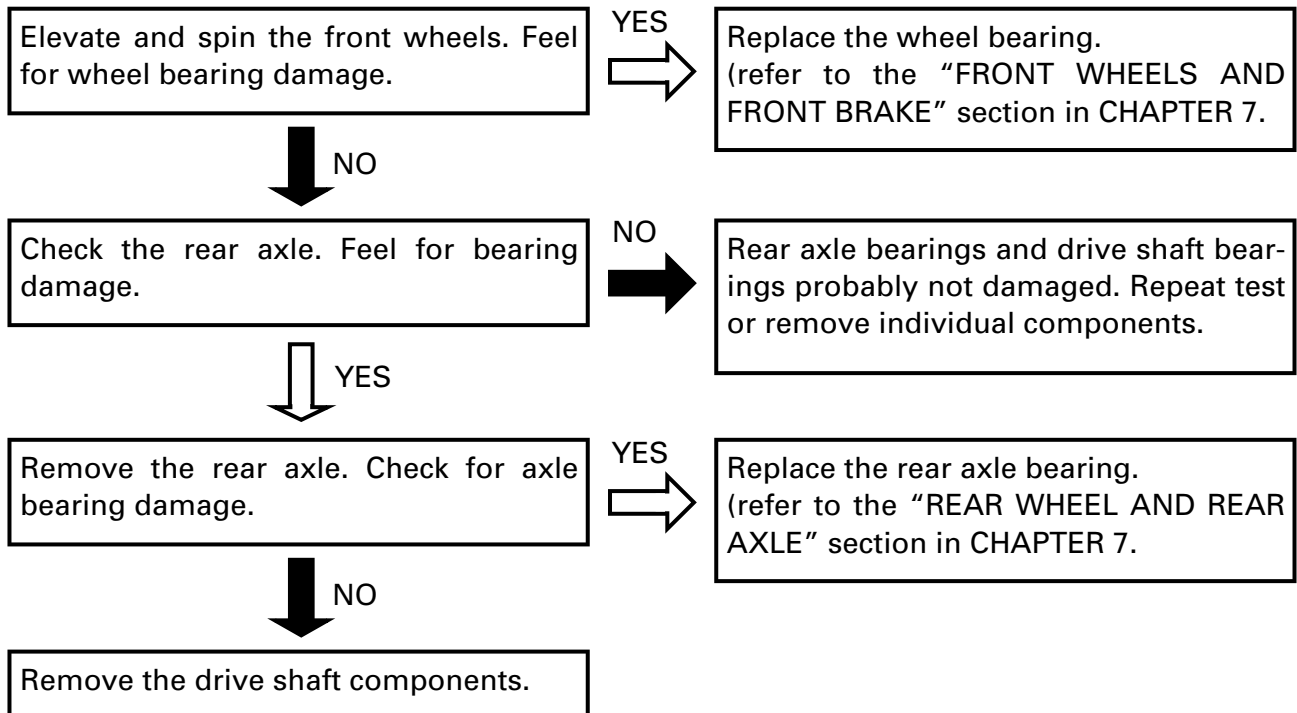
### NOTE:

- An apparent oil leak on a new or nearly new machine may be the result of a rest preventative coating or excessive seal lubrication.
- Always clean the machine and recheck the suspected location of an apparent leakage.

\*\*\*\*\*

## Troubleshooting chart

When basic condition “a” and “b” above exist, check the following points:



## REMOVAL

### **WARNING**

**Securely support the machine so there is no danger of it falling over.**

#### 1.Drain:

- Final gear oil  
Refer to the "FINAL GEAR OIL REPLACEMENT" section in CHAPTER 3.

#### 2.Remove:

- Seat
- Rear carrier
- Rear fender  
Refer to the "FENDERS AND FUEL TANK-REAR FENDER" section in CHAPTER 3.

#### 3.Remove:

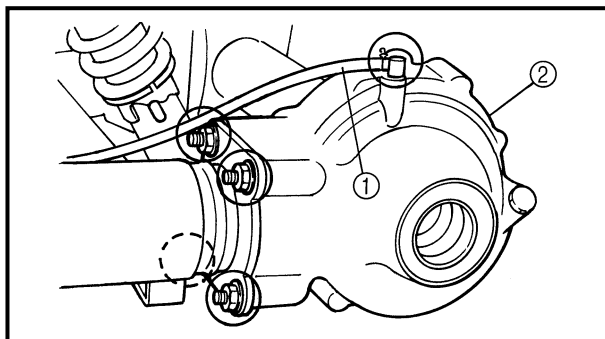
- Rear wheel (left)
- Wheel hub
- Rear wheel (right)
- Brake drum
- Rear axle
- Refer to "REAR WHEEL/REAR BRAKE AND REAR AXLE - Removal" section in CHAPTER 7.

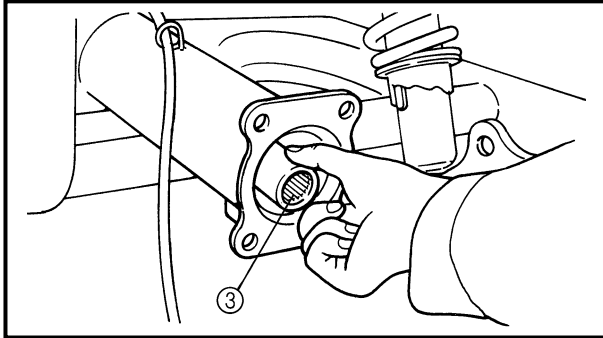
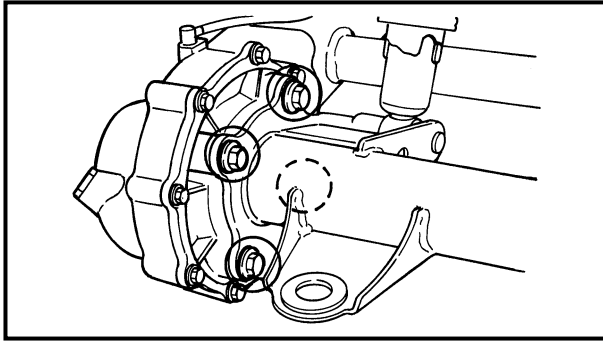
#### 4.Disconnect:

- Breather hose ① (final gear case)

#### 5.Remove:

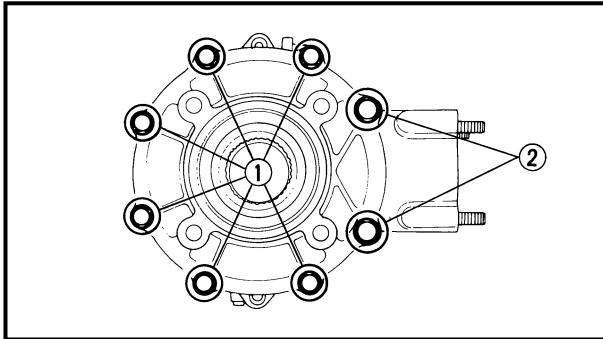
- Final gear case unit ②





## NOTE:

- When the final gear case until is removed from the swingarm, the drive shaft ③ may fall off.
- Be careful not to lose these parts.



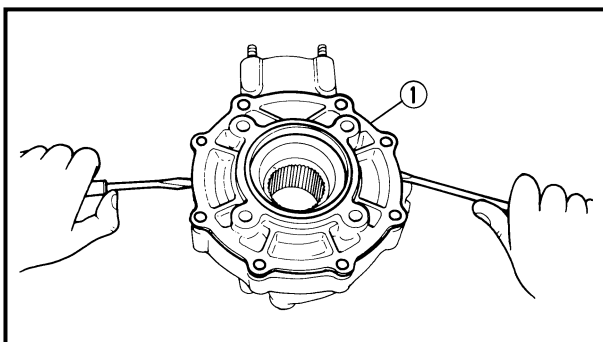
## DISASSEMBLY

### 1.Remove:

- Bolts ① (8 mm)
- Bolts ② (10 mm)

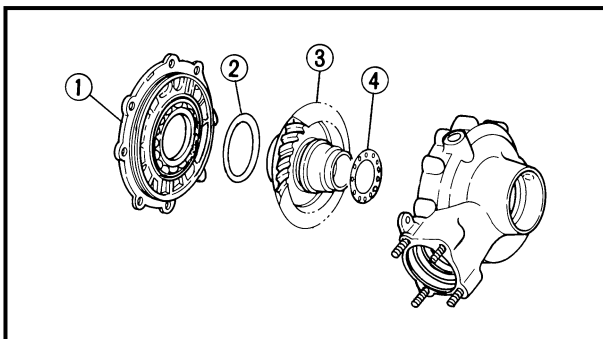
## NOTE:

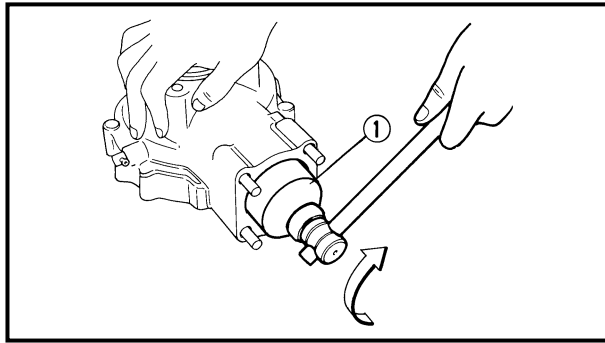
Working in a crisscross pattern, loosen bolt 1/4 turn each. Remove them after all loosened.



### 2.Remove:

- Bearing housing ①
- Shim(s) ②
- Ring gear ③
- Thrust washer ④





3.Remove:

- Bearing retainer (drive shaft - final)

**NOTE:**

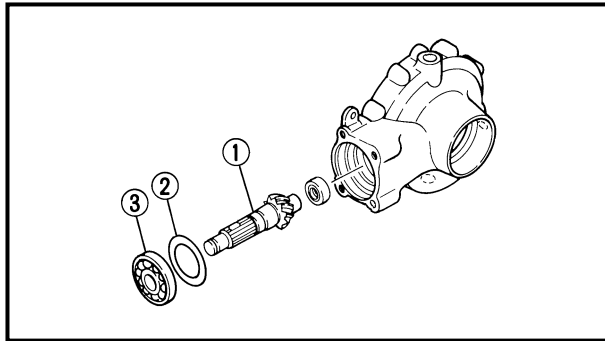
Final-drive-shaft-bearing-retainer has left-hand threads. Turn retainer clockwise to loosen it.

**NOTE:**

When remounting the bearing retainer, use the Bearing Retainer Wrench (1).



**Bearing retainer wrench:**  
P/N. YM-04050, 90890-04050



4.Remove:

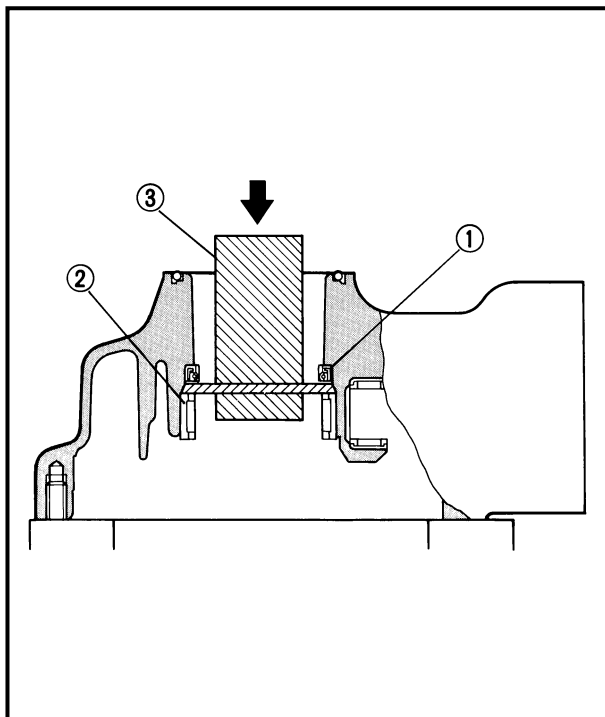
- Drive pinion gear (1)  
(together with the shim(s) (2) and bearing (3))  
Tap lightly on the final drive pinion gear end with a soft hammer.

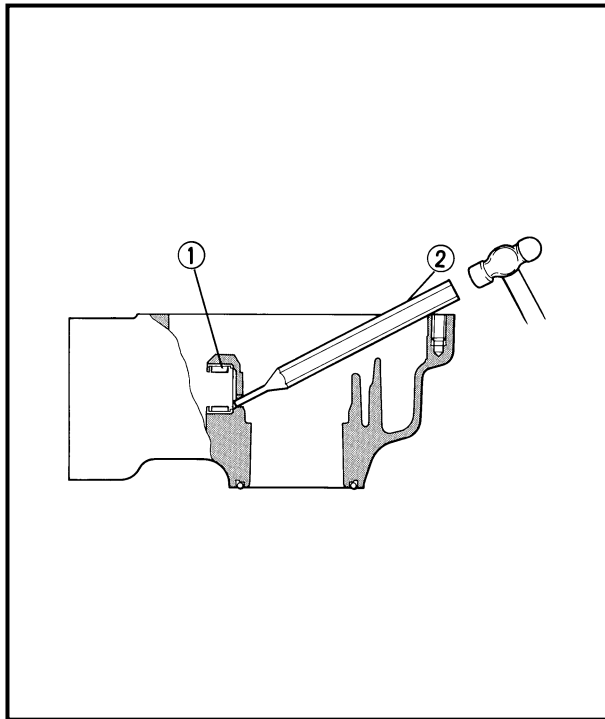
**CAUTION:**

Final drive pinion gear removal should be performed only if gearing replacement is necessary. Do not reuse bearings or races after removal.

5.Remove:

- Oil seal (1)
- Roller bearing (2) (ring gear)  
Use a suitable press tool (3) and an appropriate support for the main housing.





6.Remove:

- Roller bearing ① (drive pinion gear)

\*\*\*\*\*

## Removal steps:

- Heat the main housing only to 150°C (302°F).
- Remove the roller bearing outer race with an appropriately shaped punch ②.
- Remove the inner race from the final drive shaft.

## NOTE:

The removal of the final drive shaft roller bearing is difficult and seldom necessary.

## INSPECTION

1.Inspect:

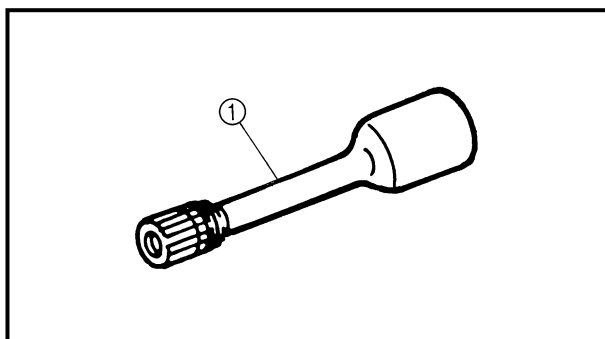
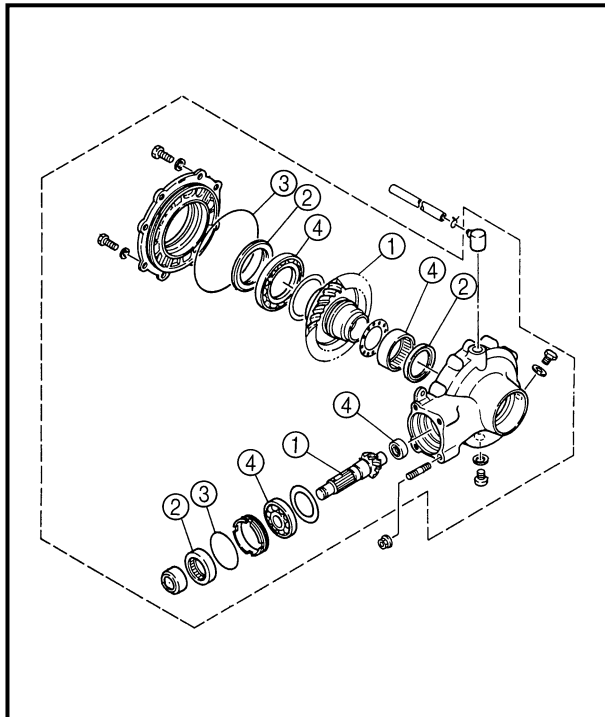
- Gear teeth ①  
Pitting/Galling/Wear → Replace drive pinion gear and ring gear as a set.
- Oil seal ②
- O-ring ③  
Damage → Replace.

2.Inspect:

- Bearings ④  
Damage → Replace.

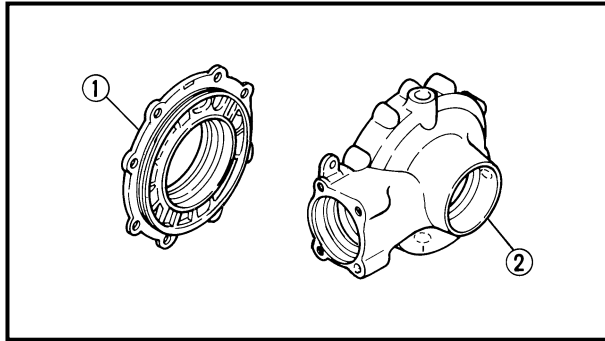
## NOTE:

- Reuse of roller bearing OK, but Yamaha recommends installation of new bearing. Do not reuse the oil seal.
- When the final drive pinion gear and/or ring gear are replaced, be sure to adjust the shim of the final drive pinion gear and/or ring gear, refer to the "FINAL DRIVE GEAR AND RING GEAR SHIM SELECTION" section.



3.Inspect:

- Drive shaft ① (splines)  
Wear/Damage → Replace.



## 4. Inspect:

- Final gear case ①
  - Bearing housing ② (ring gear)
- Cracks/Damage → Replace.

## NOTE:

When the final gear case and/or ring gear bearing housing are replaced, be sure to adjust the shim of the final drive pinion gear and/or ring gear, refer to the "FINAL DRIVE GEAR AND RING GEAR SHIM SELECTION" section.

## FINAL DRIVE PINION GEAR AND RING GEAR SHIM SELECTION

When the final drive pinion gear, ring gear, final gear case and/or ring gear bearing housing are replaced, be sure to adjust the positions for the final drive pinion gear and ring gear by the shim(s).

### Final drive pinion gear shim(s) selection

#### 1. Select:

- Final drive pinion gear shim(s) ①

\*\*\*\*\*

#### Shim selection steps:

- To find final drive pinion gear shim thickness "A", use the following formula.

#### Final drive pinion gear shim thickness:

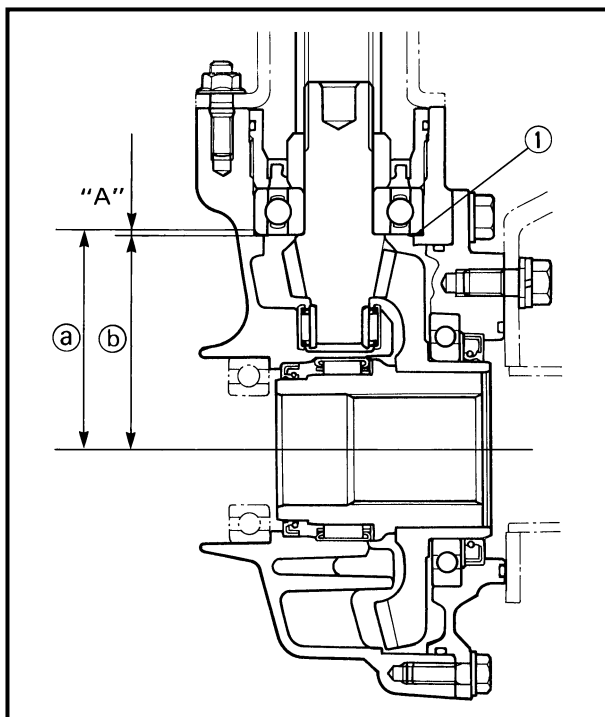
$$"A" = (a) - (b)$$

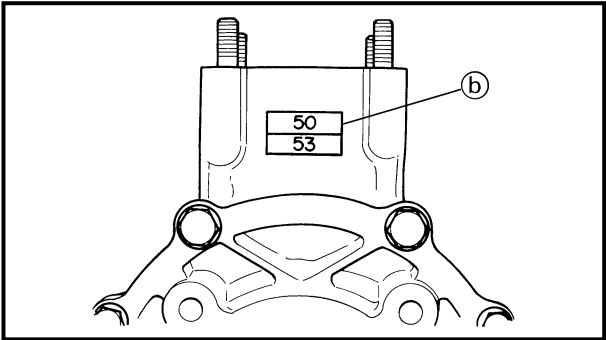
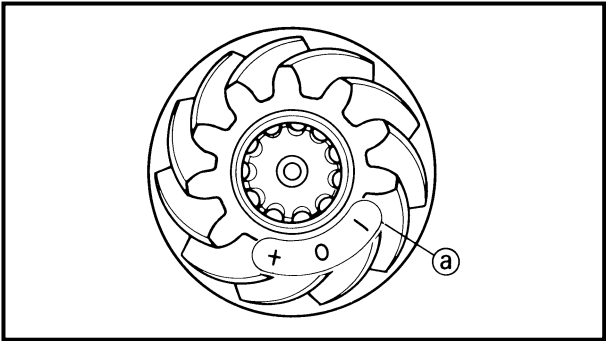
① = The stamped number on the final drive pinion gear is either added to or subtracted from "79".

② = The stamped number on the final gear case is either added to or subtracted from "78".

## NOTE:

All stamped numbers are in hundredths of a mm.





Example:

- 1) If the “+01” is stamped on the final drive pinion gear,  
Ⓐ = 79 + 0.01 = 79.01
- 2) If the “50” is stamped on the final gear case,  
Ⓑ = 78 + 0.50 = 78.50
- 3) Therefore, “A” is,  
“A” = 79.01 – 78.50 = 0.51 mm
- 4) Round off hundredths digit and select appropriate shim(s).

In the example above, the calculated number is 0.51. The chart instructs you to round off 1 to 0 at the hundredth place.

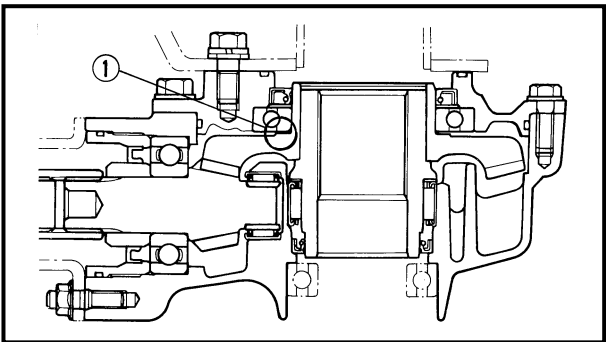
Thus, the shim thickness is 0.50 mm.

Hundredths	Round value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10

Shim sizes are supplied in the following thickness.

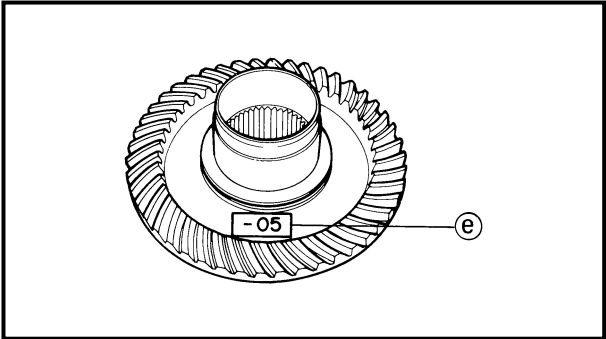
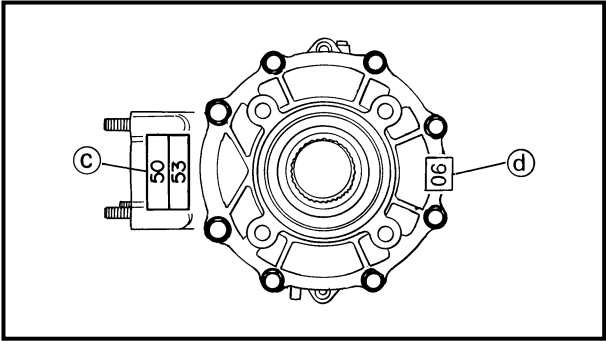
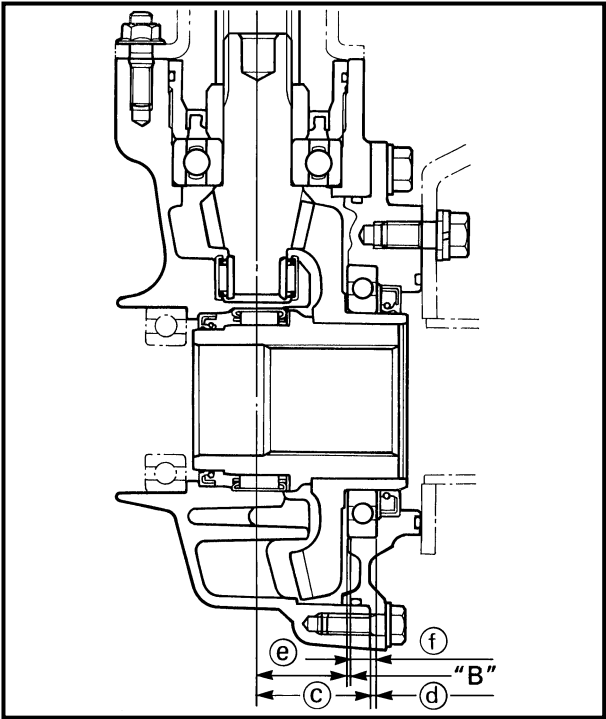
	Final drive pinion gear shim	
Thickness (mm)	0.15 0.30 0.40	0.50 0.60

\*\*\*\*\*



Ring gear shim(s) selection

- 1.Select:
  - Ring gear shim(s) ①



\*\*\*\*\*

**Shim selection steps:**

- To find ring gear shim thickness "B", use the following formula.

**Ring gear shim thickness:**  
**"B" = c + d - (e + f)**

- ©= The stamped number on the final gear case is either added to or subtracted from "42".
- ©d= The stamped number on outside of ring gear bearing housing and added to "2".
- ©e= The stamped number on inside of ring gear either added to or subtracted from "33".
- ©f= Bearing thickness (considered constant) "11.00 mm".

**Example:**

- 1) If the "53" is stamped on the final gear case,  
© = 42 + 0.53 = 42.53
- 2) If the "06" is stamped on the ring gear bearing housing,  
©d = 2 + 0.06 = 2.06 mm
- 3) If the "-05" is stamped on the ring gear,  
©e = 33 - 0.05 = 32.95 mm
- 4) ©f = is 11.00.
- 5) Therefore, shim thickness "B" is,  
"B" = 42.53 + 2.06 - (32.95 + 11.00)  
= 44.59 - 43.95 = 0.64 mm
- 6) Round off hundredths digit and select appropriate shim(s).  
In the example above, the calculated number is 0.64. The chart instructs you to round off the 4 to 5 at the hundredth place. Thus, the shim thickness is 0.65 mm.

Hundredths	Round value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10

Shim sizes are supplied in the following thickness.

Ring gear shim		
Thickness (mm)	0.25 0.30	0.40 0.50

\*\*\*\*\*



## ASSEMBLY

Reverse the "DISASSEMBLY" procedures.  
Note the following points.

### 1.Install:

- Roller bearing (drive pinion gear)

\*\*\*\*\*

### Installation steps:

- Heat the main housing only to 150°C (302°F)
- Install the roller bearing outer race using the proper adapted.
- Install the inner race onto the drive shaft.

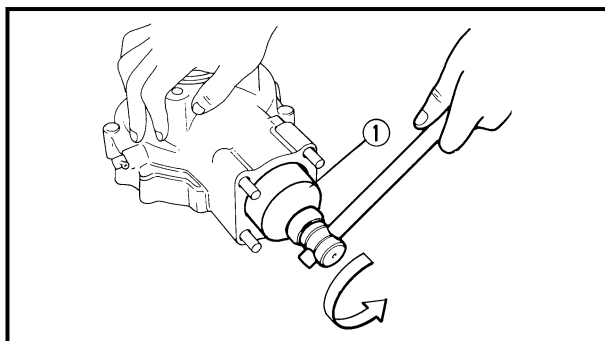
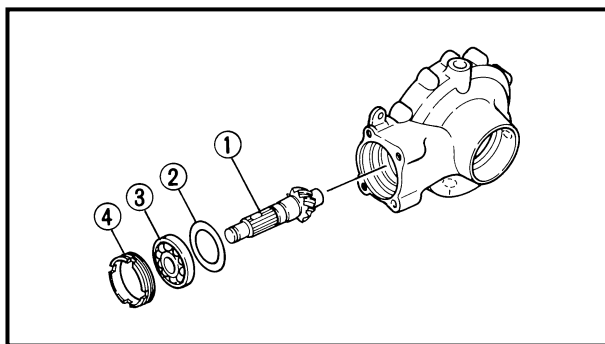
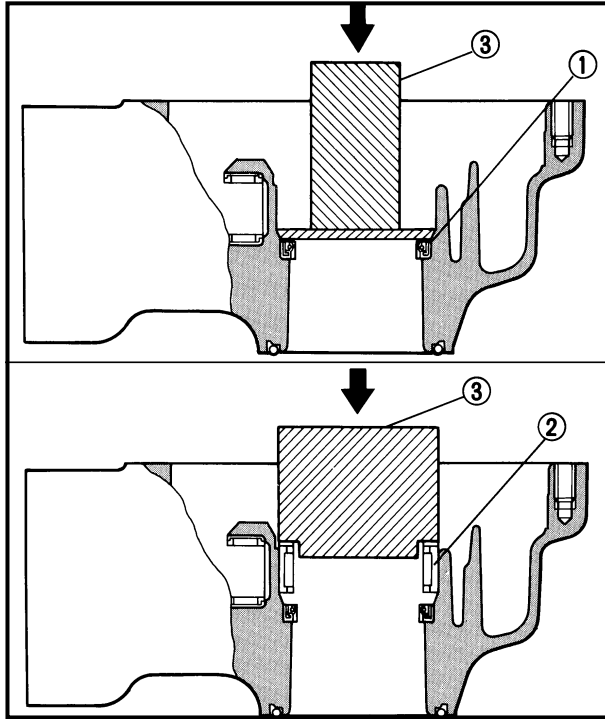
\*\*\*\*\*

### 2.Install:

- Oil seal ①
- Roller bearing ② (outer race)  
Use a suitable press tool ③ and a press to install the above components into the main housing.

## ⚠ WARNING

Always use a new oil seal.



### 3.Install:

- Drive pinion gear ① (with shim(s) ② and bearing ③)  
Shim(s) → (proper size as calculated)
- Bearing retainer ④ (drive pinion gear)

### NOTE:

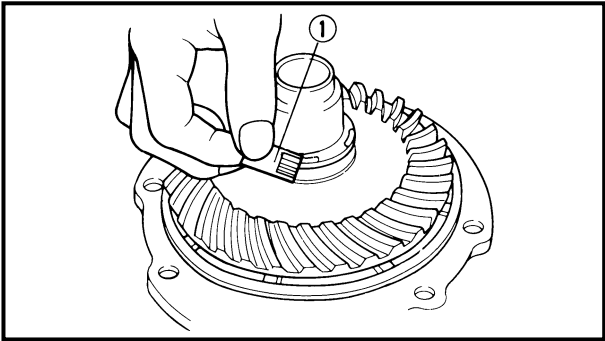
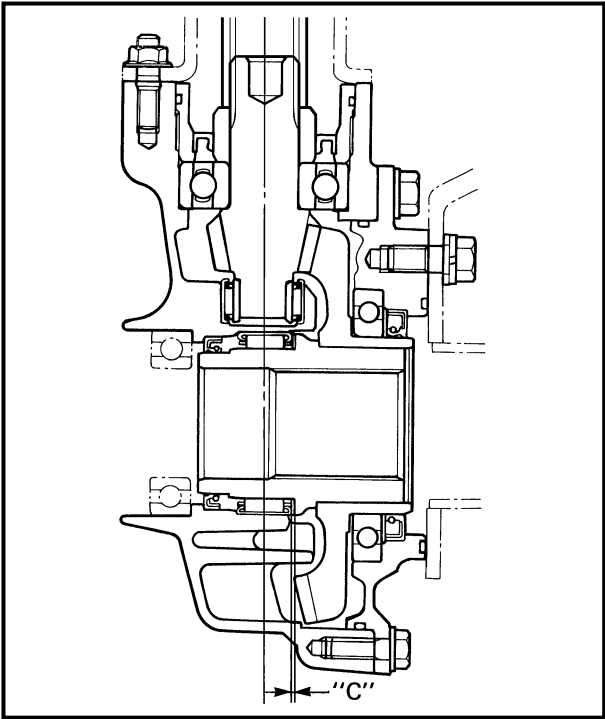
- The bearing retainer has left-hand threads; turn retainer counterclockwise to tighten it.
- Before installing the bearing retainer, apply the grease to the O-ring.
- When installing the bearing retainer, use the Bearing Retainer Wrench ①.



**Bearing retainer wrench:**  
P/N. YM-04050, 90890-04050



**Bearing retainer:**  
100 Nm (10.0 m • kg, 72 ft • lb)



**Thrust washer selection**

1.Measure/Select:

- Ring gear thrust clearance "C"

\*\*\*\*\*

**Thrust clearance measurement steps:**

- Place four pieces of Plastigauge® between originally fitted thrust washer and ring gear.
- Install the ring gear assembly and tighten the bolts to specification.



**10 mm Bolts (bearing housing):**  
**40 Nm (4.0 m • kg, 29 ft • lb)**  
**8 mm Bolts (bearing housing):**  
**23 Nm (2.3 m • kg, 17 ft • lb)**

**NOTE:**

Do not turn the shaft drive and ring gear when measuring clearance with Plastigage®.

- Remove the ring gear assembly.
- Measure the thrust clearance. Calculate width of flattened Plastigauge® ①.



**Ring gear thrust clearance:**  
**0.1 ~ 0.2 mm (0.004 ~ 0.008 in)**

- If the out of specification, select the correct washer.

**Thrust washer selection steps:**

- Select suitable thrust washer by the following chart.



**Thrust washer**

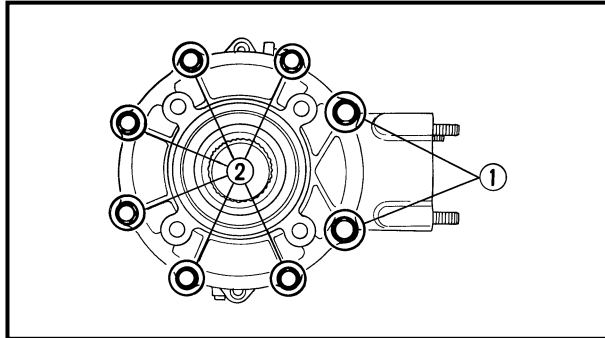
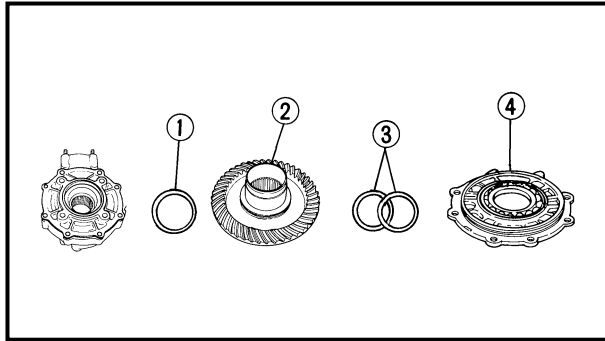
Thickness (mm)	1.2	1.7	2.0
	1.4	1.8	2.1
	1.6	1.9	

- Repeat measurement steps until the ring gear thrust clearance is within the specified limits.



**Ring gear thrust clearance:**  
**0.1 ~ 0.2 mm (0.004 ~ 0.008 in)**

\*\*\*\*\*



## 2.Install:

- Thrust washer ①
- Ring gear ②
- Shim(s) ③ (proper size as calculated)
- Bearing housing ④

## NOTE:

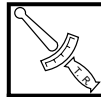
- Before installing the ring gear, apply the grease to the oil seal lips.
- Before installing the bearing housing, apply the grease to the O-ring.

## 3.Install:

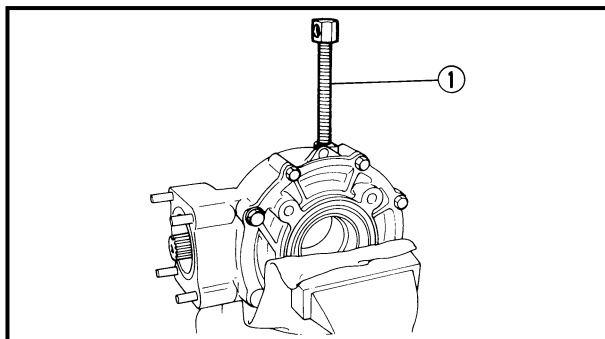
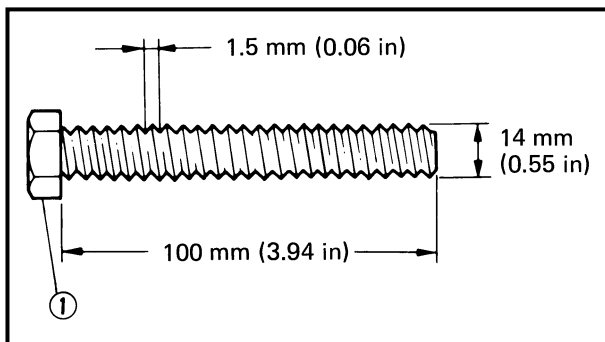
- 10 mm bolts ① (bearing housing)
- 8 mm bolts ② (bearing housing)

## NOTE:

Tighten the bolts in stage, using a criss-cross pattern.



**10 mm Bolts (bearing housing):**  
40 Nm (4.0 m · kg, 29 ft · lb)  
**8 mm Bolts (bearing housing):**  
23 Nm (2.3 m · kg, 17 ft · lb)



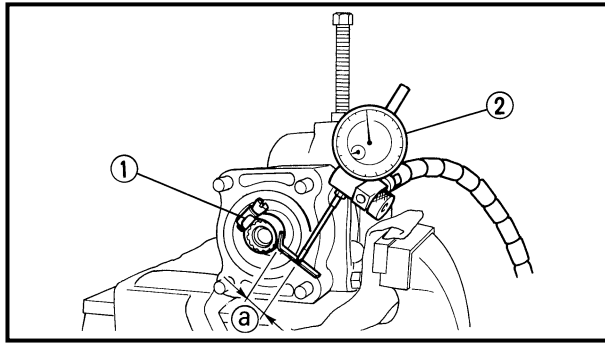
## FINAL GEAR GEAR LASH MEASUREMENT AND ADJUSTMENT

### Final gear gear lash measurement

1. Secure the gear case in a vise or other support.
2. Remove:
  - Drain plug
  - Gasket
3. Install:
  - A bolt of the specified size ①
 Into the drain plug hole.

## CAUTION:

Finger tighten the bolt until it holds the ring gear. Otherwise, the ring gear will be damage.



## 4.Attach:

- Gear lash measurement tool ①
- Dial gauge ②



**Gear lash measurement tool:**  
P/N. YM-01231, 90890-01231  
**Dial gauge:**  
P/N. YU-03097, 90890-03097

① Measuring point

## 5.Measure:

- Gear lash

Gently rotate the gear coupling from engagement to engagement.

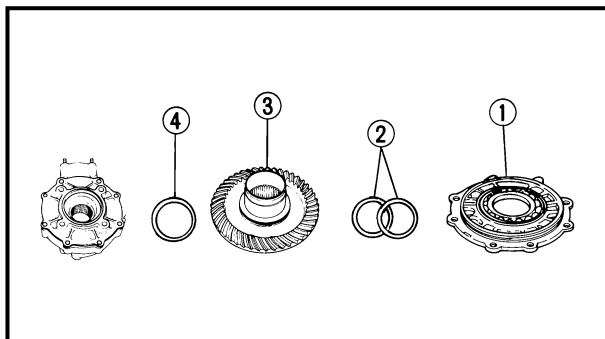
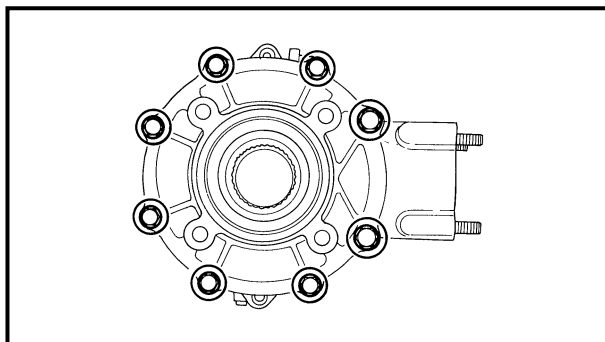
If the measured value in step 5 is different than that of the calculated value for shim size on page 6-32, repeat the following steps using the measured value in step 5.



**Final gear gear lash:**  
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

## NOTE:

Measure the gear lash at 4 positions rotate the shaft 90° each time.



## Final gear lash adjustment

### 1.Remove:

- 8 mm bolts (bearing housing)
  - 10 mm bolts (bearing housing)
- Refer to the "FINAL DRIVE GEAR AND DRIVE SHAFT – DISASSEMBLY" section.

### 2.Remove:

- Bearing housing ①
- Shim(s) ②
- Ring gear ③
- Thrust washer ④

Refer to the "FINAL DRIVE GEAR AND DRIVE SHAFT–DISASSEMBLY" section.

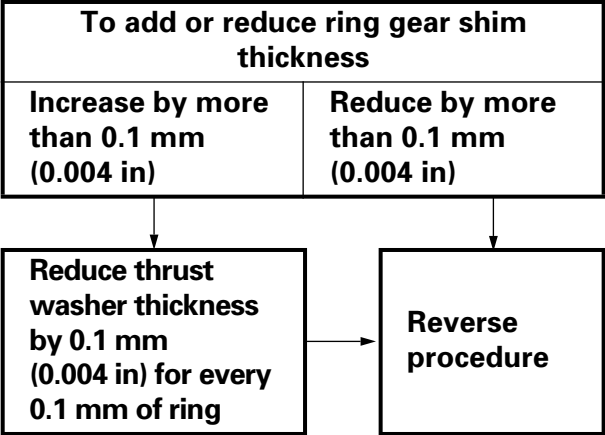
- 3.Adjust:
- Gear lash


\*\*\*\*\*


**Gear lash adjustment steps:**

- Select the suitable shims and thrust washer by the following chart.

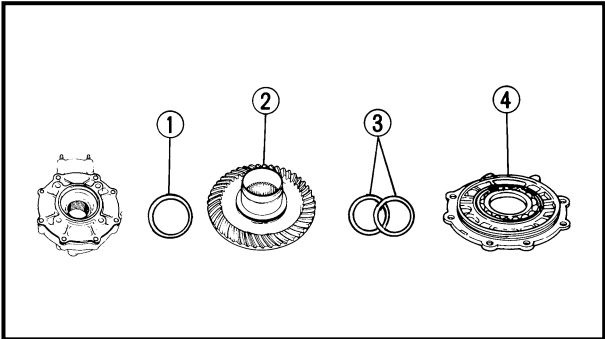
**Too-little gear lash →  
Reduce shim thickness.  
Too-large gear lash →  
Increase shim thickness.**



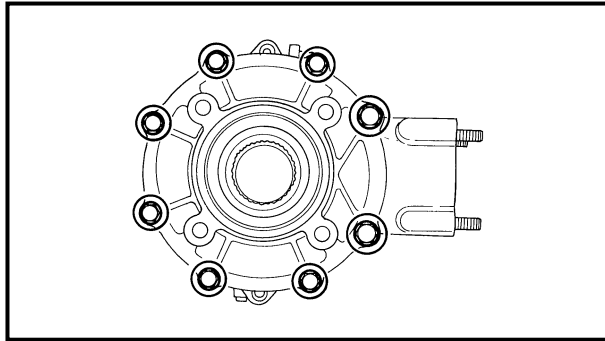
	Ring gear shim			
Thickness (mm)	0.25	0.30	0.35	
	0.40	0.45	0.50	

	Thrust washer			
Thickness (mm)	1.2	1.7	2.0	
	1.4	1.8	2.1	
	1.6	1.9		

\*\*\*\*\*



- 4.Install:
- Thrust washer ①
  - Ring gear ②
  - Shim(s) ③
  - Bearing housing ④
  - Refer to the “FINAL DRIVE GEAR AND DRIVE SHAFT – ASSEMBLY” section.



## 5.Install:

- 10 mm bolts (bearing housing)
- 8 mm bolts (bearing housing)



**10 mm Bolts (bearing housing):**  
**40 Nm (4.0 m • kg, 29 ft • lb)**  
**8 mm Bolts (bearing housing):**  
**23 Nm (2.3 m • kg, 17 ft • lb)**

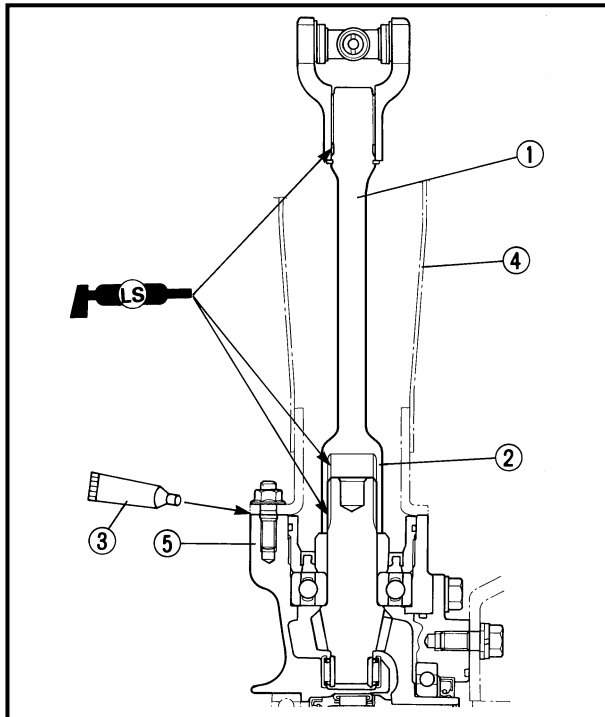
Refer to the “FINAL DRIVE GEAR AND DRIVE SHAFT – ASSEMBLY” section.

## 6.Measure:

- Gear lash
- If the gear lash is incorrect → Repeat.



**Final gear lash:**  
**0.1 ~ 0.2 mm (0.004 ~ 0.008 in)**



## INSTALLATION

Reverse the “REMOVAL” procedures. Note the following points.

### 1.Lubricate:

- Drive shaft ① (splines)



**Lightweight lithium - soap  
base grease**

### 2.Apply:

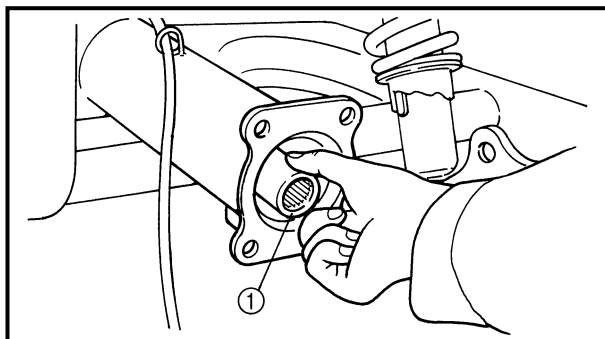
- Sealant ②  
(to matching surfaces of swingarm ③ and final gear case ④)

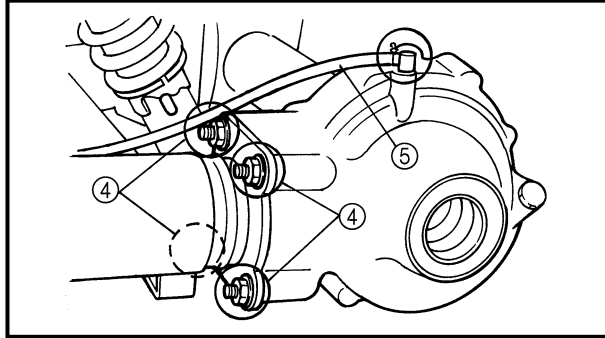
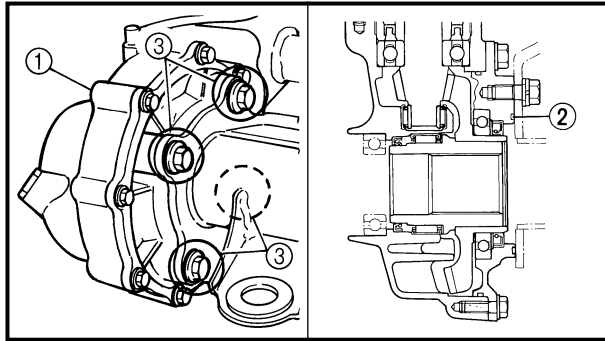


**Sealant (Quick Gasket®)**  
**P/N. ACC-QUICK-GS-KT**  
**Yamaha Bond No. 1215®:**  
**P/N. 90890-85505**

### 3.Install:

- Drive shaft ①  
(to universal joint)



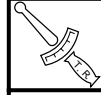


## 4.Install:

- Final gear case unit ①

## NOTE:

Before installing the final gear case unit, apply the grease to the O-ring ②.



**Bolt (final gear case – axle housing) ③:**

**55 Nm (5.5 m • kg, 40 ft • lb)**

**Nut (final gear case – swingarm)**

**④:**

**48 Nm (4.8 m • kg, 35 ft • lb)**

## 5.Connect:

- Breather hose ⑤ (final gear case)

## CAUTION:

**Make sure the final gear case breather hose is routed correctly.**

## 6.Install:

- Rear axle
- Final gear case protector
- Brake drum
- Rear wheel (right)
- Wheel hub
- Rear wheel (left)

Refer to the “REAR WHEEL/REAR BRAKE AND REAR AXLE - Installation” section in CHAPTER 7.

## 7.Fill:

- Final gear case



**Recommended oil:**

**SAE 80 API “GL-4” hypoid gear oil**

**If desired, and SAE 80W90 hypoid gear oil may be used for all condition.**

**Oil quantity:**

**0.27 L (0.24 Imp qt, 0.29 US qt)**

Refer to the “FINAL GEAR OIL PEPLACEMENT” section in CHAPTER 3.

## 8.Install:

- Rear fender
- Seat
- Rear carrier

Refer to the “FENDERS AND FUEL TANK-REAR FENDER-Installation” section in CHAPTER 3.







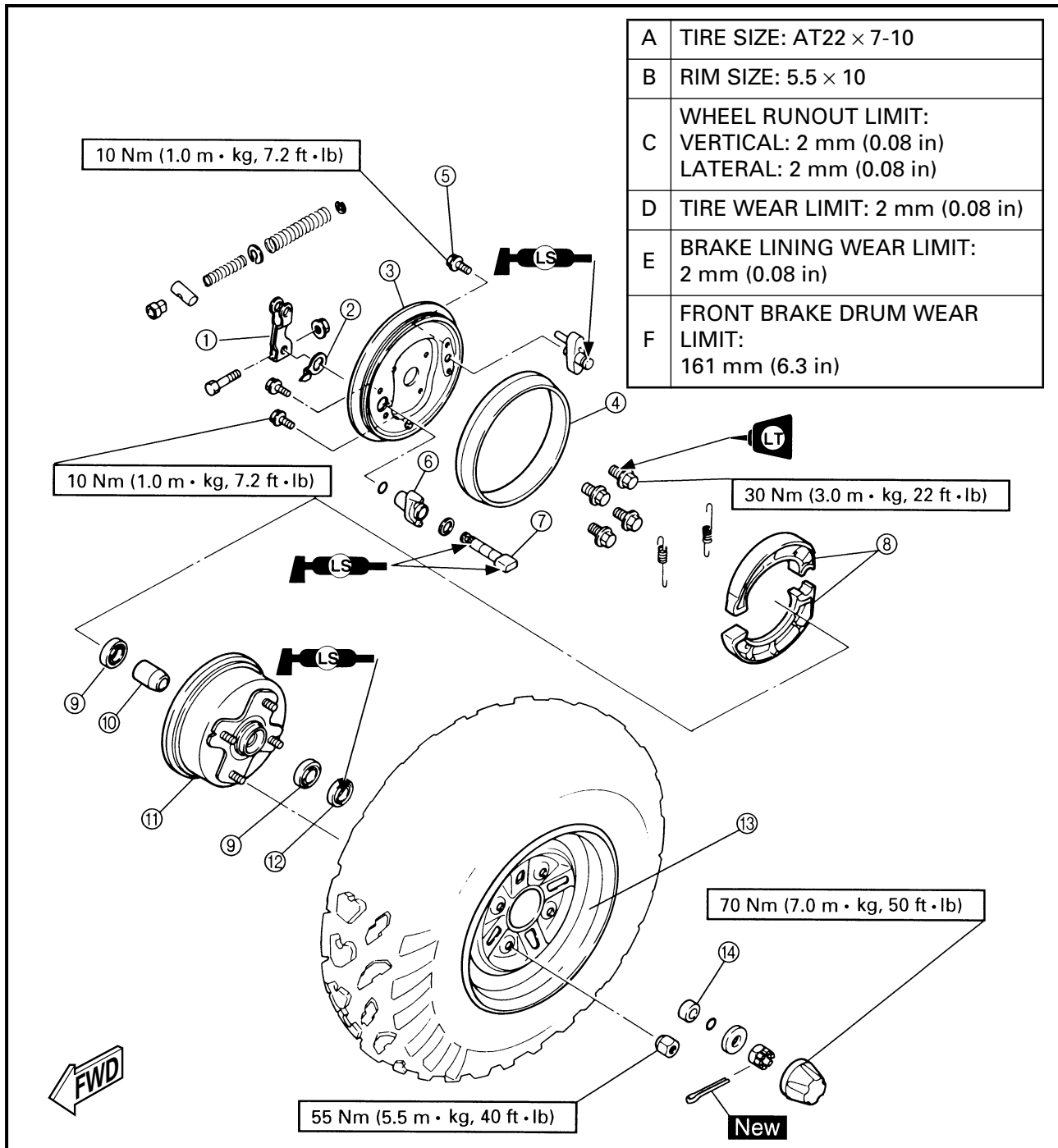
### CHASSIS

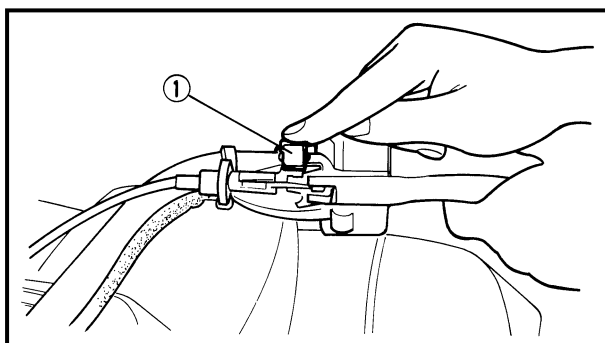
#### FRONT WHEELS AND FRONT BRAKE

- ① Brake camshaft lever
- ② Wear indicator plate
- ③ Brake shoe plate
- ④ Brake shoe plate seal
- ⑤ Pivot pin
- ⑥ Brake camshaft holder
- ⑦ Brake camshaft
- ⑧ Brake shoe
- ⑨ Bearing
- ⑩ Bearing spacer
- ⑪ Front brake drum
- ⑫ Oil seal
- ⑬ Front wheel
- ⑭ Collar

#### TIRE AIR PRESSURE

Cold Tire Pressure	Front	Rear
Standard	20 kPa (0.20 kg/cm <sup>2</sup> , 2.8 psi)	25 kPa (0.25 kg/cm <sup>2</sup> , 3.6 psi)
Minimum	17 kPa (0.17 kg/cm <sup>2</sup> , 2.4 psi)	22 kPa (0.22 kg/cm <sup>2</sup> , 3.2 psi)
Maximum	23 kPa (0.23 kg/cm <sup>2</sup> , 3.2 psi)	28 kPa (0.28 kg/cm <sup>2</sup> , 4.0 psi)





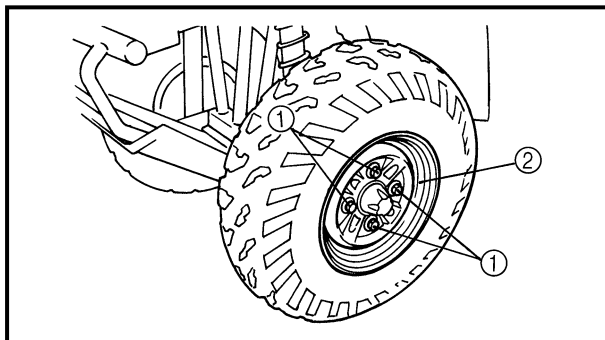
### REMOVAL

#### Front wheels

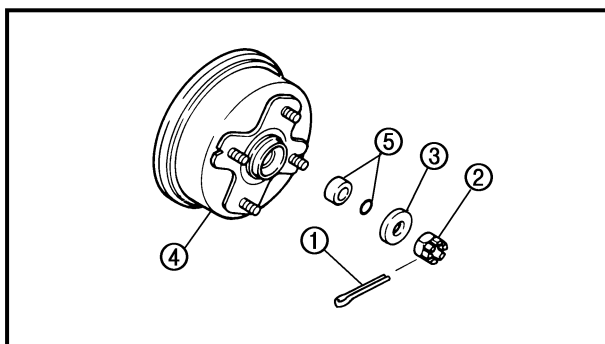
1. Place the machine on a level place.
2. Loosen:
  - Nuts (front wheel)
3. Elevate the front wheels by placing the suitable stand under the frame.

### ⚠ WARNING

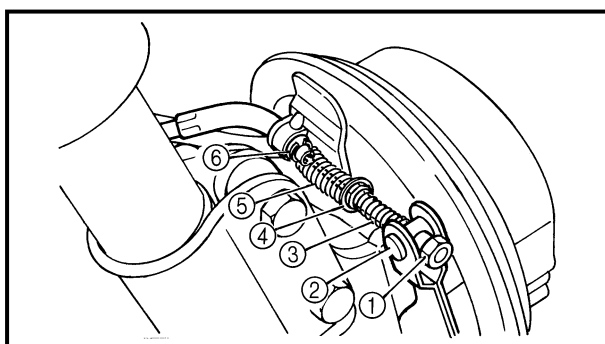
**Securely support the machine there is no danger of falling over.**



4. Remove:
  - Nuts ① (front wheel)
  - Front wheel ②



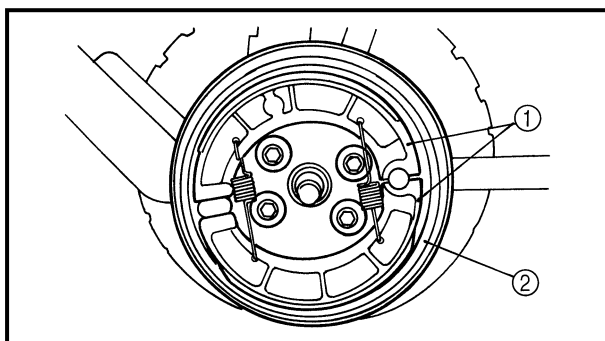
5. Remove:
  - Cotter pin ①
  - Axle nut ②
  - Plain washer ③
  - Brake drum ④
  - Spacer collar ⑤

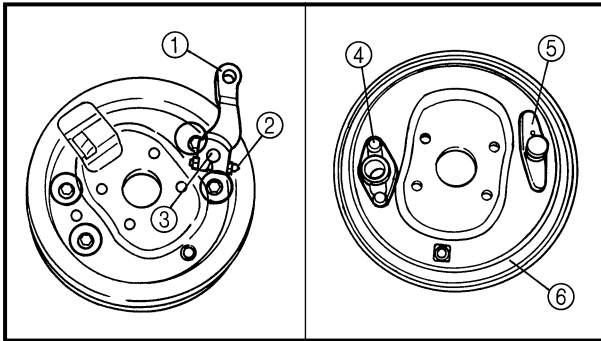


6. Remove:
  - Adjuster ①
  - Pin ②
  - Spring ③
  - Washer (C-type) ④
  - Spring ⑤
  - Circlip ⑥

7. Disconnect:
  - Brake cable (from brake shoe plate)
  - Front brake breather hose

8. Remove:
  - Brake shoes ①
  - Brake shoe plate assembly ②





9.Remove:

- Brake camshaft lever ①
- Wear indicator plate ②
- Brake camshaft ③
- Brake camshaft holder ④
- Pivot pin ⑤
- Brake shoe plate ⑥

### INSPECTION

1.Inspect:

- Wheel

Refer to the "WHEEL INSPECTION" section in CHAPTER 3.

2.Measure:

- Wheel runout

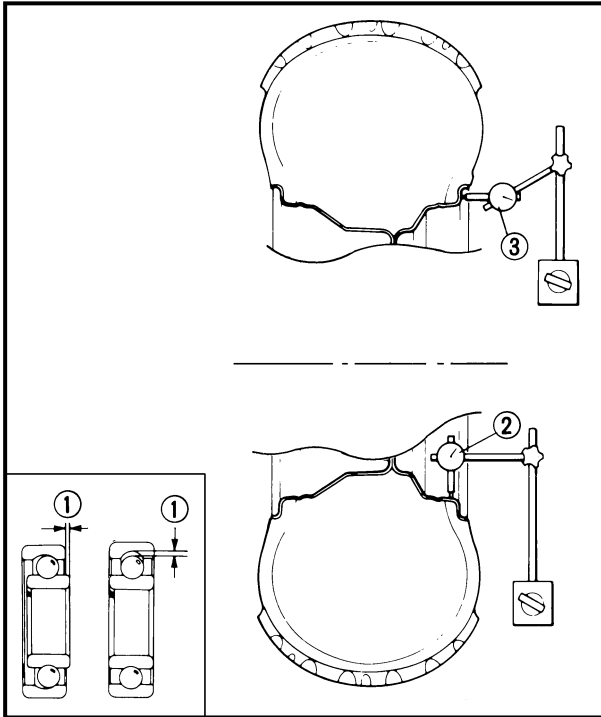
Over specified limit → Replace wheel or check bearing play ①.



**Rim runout limits:**

**Vertical ②: 2.0 mm (0.08 in)**

**Lateral ③: 2.0 mm (0.08 in)**



3.Inspect:

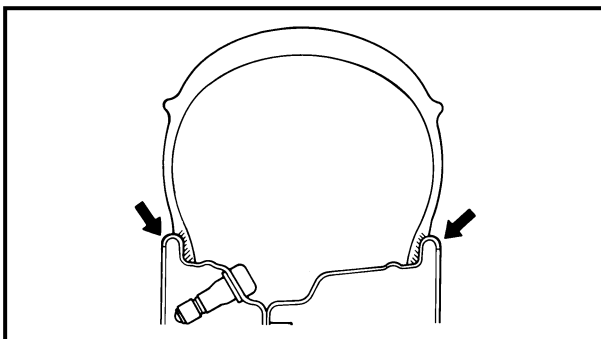
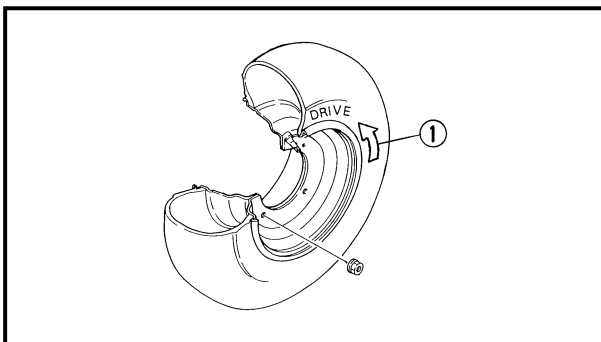
- Tire surfaces

Wear/Damage → Replace.

Refer to the "TIRE INSPECTION" section in CHAPTER 3.

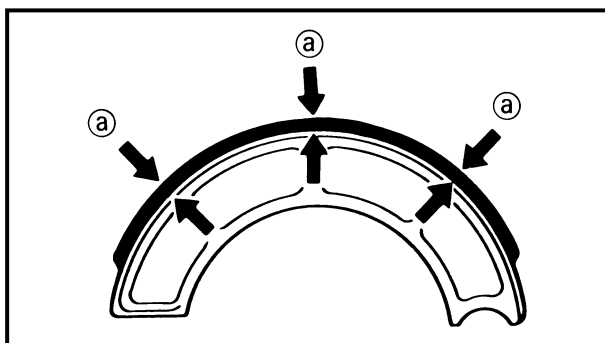
### NOTE:

Install the tire with the "ROTATION" mark ① to the rotating direction.



### ⚠ WARNING

After replacing the tire, ride conservatively to allow the tire to be properly seated in the rim. Failure to do so may cause an accident resulting in machine damage and possible operator injury.



## 4. Inspect:

- Brake linings

Glazed parts → Sand with coarse sandpaper.

## 5. Measure:

- Brake lining thickness ②

Out of specification → Replace.



**Brake lining thickness:**

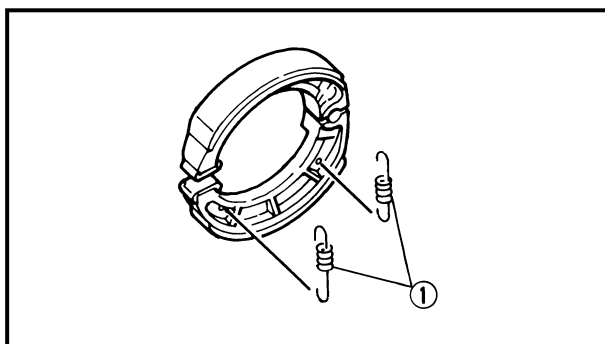
**4.0 mm (0.16 in)**

**<Wear limit>:**

**2.0 mm (0.08 in)**

## NOTE:

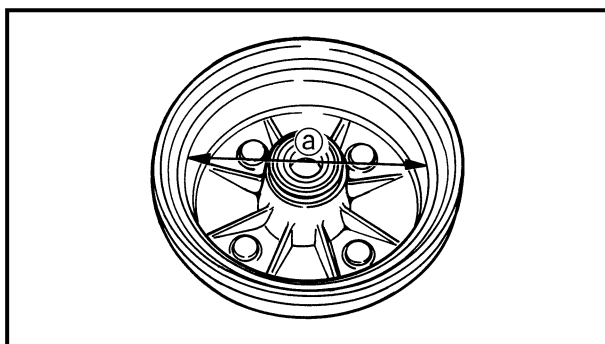
Replace the brake shoes as a set (with shoe springs) if either is found to be worn to the wear limit.



## 6. Inspect:

- Shoe springs ①

Wear/Damage → Replace.



## 7. Measure:

- Brake drum inside diameter ②

Out of specification → Replace.

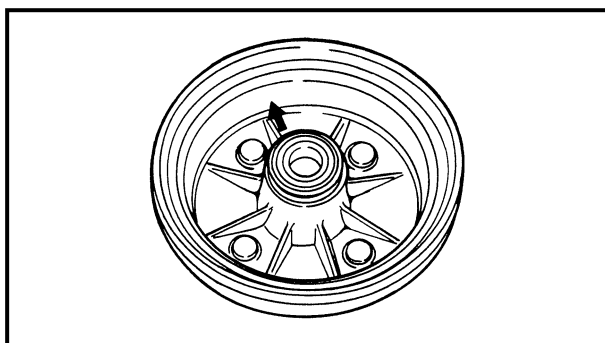


**Front brake drum inside diameter:**

**160 mm (4.3 in)**

**<Wear limit>:**

**161 mm (4.37 in)**

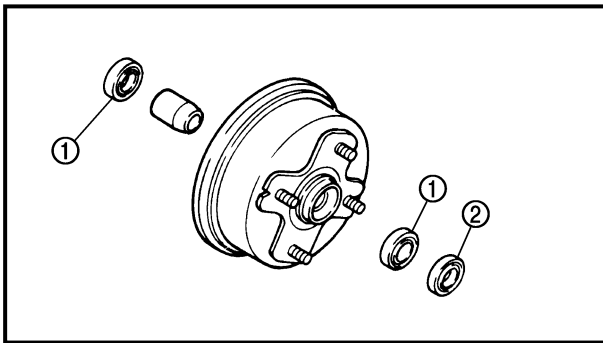


## 8. Inspect:

- Brake drum inner surface

Oil/Scratches → Remove.

Oil	Use a rag soaked in lacquer thinner or a solvent.
Scratches	Use a emery cloth (lightly and evenly polishing).



## 9. Inspect:

- Bearings ① (brake drum)  
Bearings allow play in the brake drum or the wheel turns roughly → Replace.
- Oil seal ②  
Wear/Damage → Replace.

\*\*\*\*\*

## Wheel bearing and oil seal replacement steps:

- Clean the outside of the brake drum.
- Remove the oil seal ① use a flat-head screw driver.

## NOTE:

Place a rag ② on the outer edge to protect this edge.

- Remove the bearings ③ using a general bearing puller.
- Install the new bearings and oil seal by reversing the previous steps.

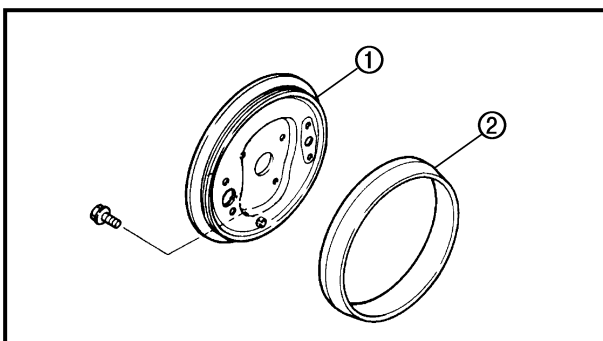
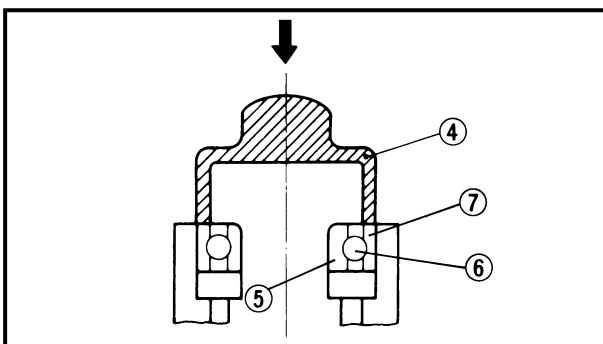
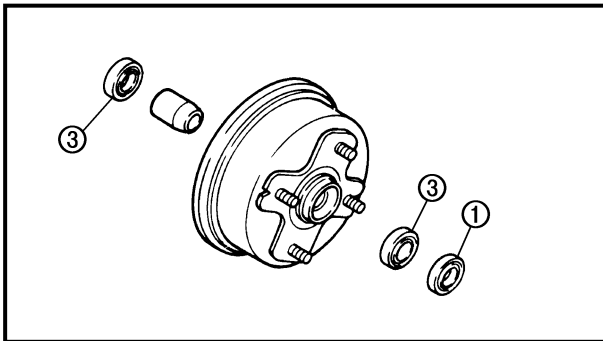
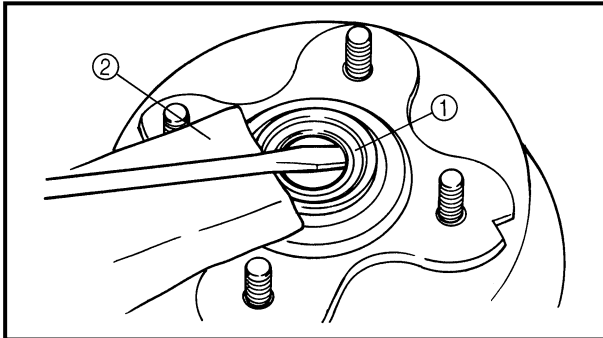
## NOTE:

Use a socket ④ that matches the outside diameter of the race of the bearing and oil seal.

## CAUTION:

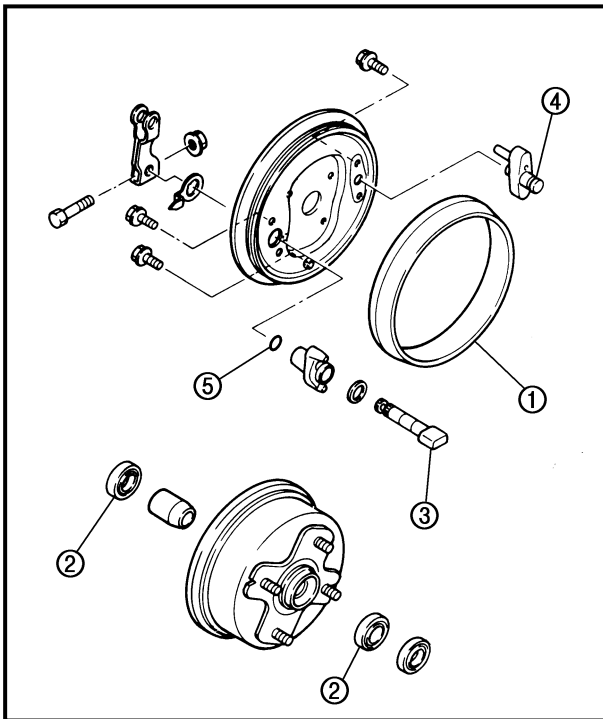
Do not strike the center race ⑤ or balls ⑥ of the bearing. Contact should be made only with the outer race ⑦.

\*\*\*\*\*



## 10. Inspect:

- Brake shoe plate ①  
Cracks/Damage → Replace.
- Brake shoe plate seal ②  
Wear/Damage → Replace.



### INSTALLATION

Reverse the "REMOVAL" procedure.

Note the following points.

#### 1. Lubricate:

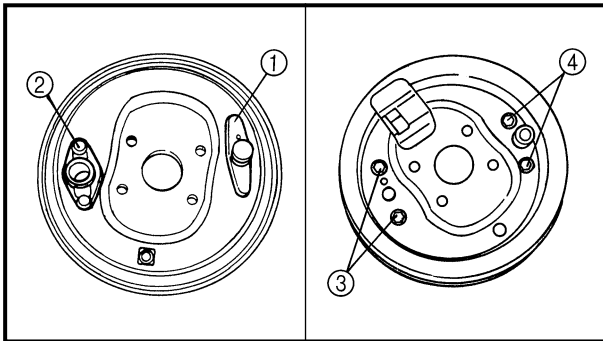
- Oil seal lips ①
- Bearings ②
- Camshaft ③
- Pivot pin ④
- O-ring ⑤



**Lithium-soap base grease**

#### CAUTION:

**Install the camshaft and the pivot pin lightly greased. Wipe off the excess grease.**



#### 2. Install:

- Pivot pin ①
- Brake camshaft holder ②

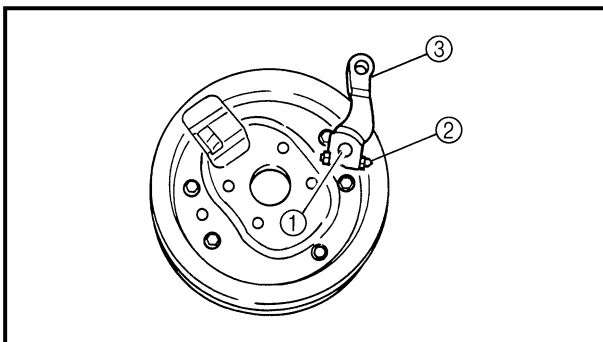


**Pivot pin bolt ③:**

**10 Nm (1.0 m • kg, 7.2 ft • lb)**

**Brake camshaft holder bolt ④:**

**10 Nm (1.0 m • kg, 7.2 ft • lb)**



#### 3. Install:

- Brake camshaft ①
- Wear indicator plate ②
- Brake camshaft lever ③

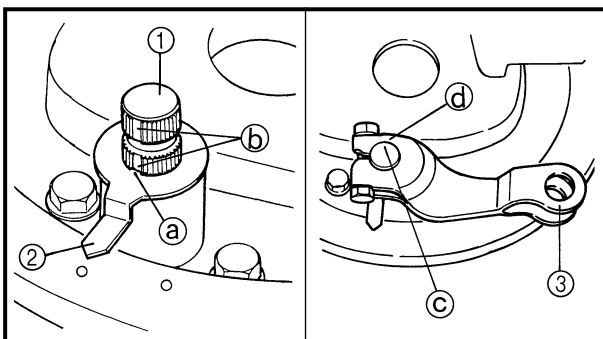
#### NOTE:

- When installing the wear indicator plate ② to the brake camshaft ① align the projection Ⓐ on the wear indicator plate with the slot Ⓑ on the brake camshaft.
- Align the punched mark Ⓒ on the brake camshaft ① with the punched mark Ⓓ on the brake camshaft lever ③.



**Brake camshaft lever:**

**9 Nm (0.9 m • kg, 6.5 ft • lb)**





4.Install:

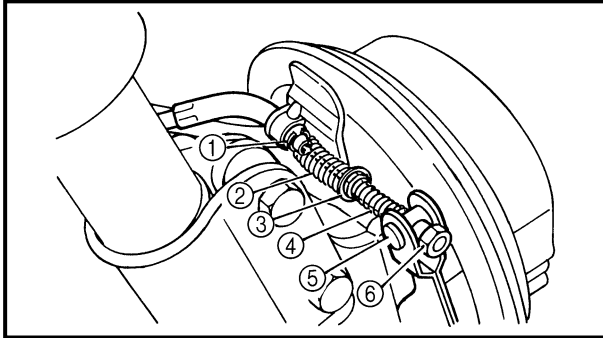
- Brake shoes

## ⚠ WARNING

Do not apply grease to the brake shoe linings.

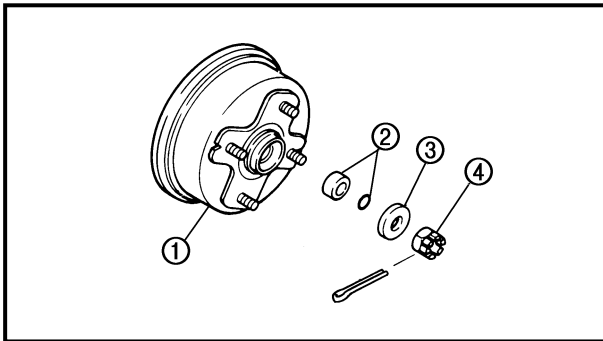
5.Connect:

- Front brake breather hose
- Brake cable (to brake shoe plate)



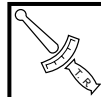
6.Install:

- Circlip ①
- Spring ②
- Washer (C-type) ③
- Spring ④
- Pin ⑤
- Adjuster ⑥

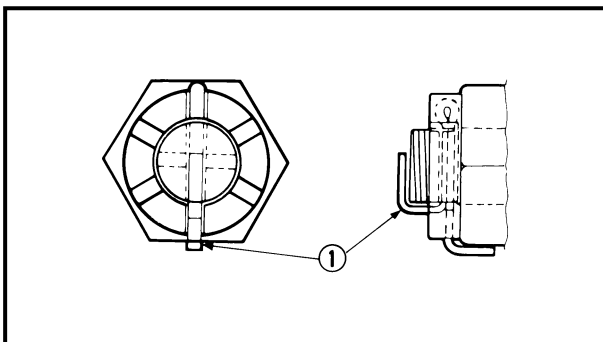


7.Install:

- Brake drum ①
- Spacer collar ②
- Plain washer ③
- Axle nut ④



**Axle nut:**  
70 Nm (7.0 m • kg, 50 ft • lb)



8.Install:

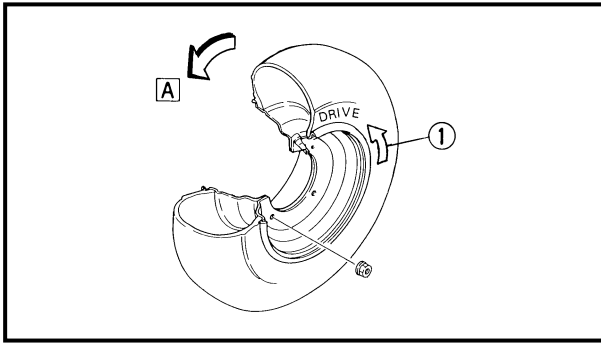
- Cotter pin ①

## NOTE:

Do not loosen the wheel hub nut after torque tightening. If the wheel hub nut groove is not aligned with the cotter pin hole, align groove with the hole by tightening up on the wheel hub nut.

## ⚠ WARNING

Always use a new cotter pin.



9.Install:

- Front wheel



**Nut (front wheel):**  
55 Nm (5.5 m • kg, 40 ft • lb)

**NOTE:**

Arrow mark ① on the tire must point toward the rotating direction **A** of the wheel.

10.Adjust:

- Front brake cable free play  
Refer to the “FRONT BRAKE ADJUSTMENT” section in CHAPTER 3.



**Front brake free play:**  
5.0 ~ 8.0 mm (0.20 ~ 0.31 in) at  
lever pivot

11.Release the parking brake.

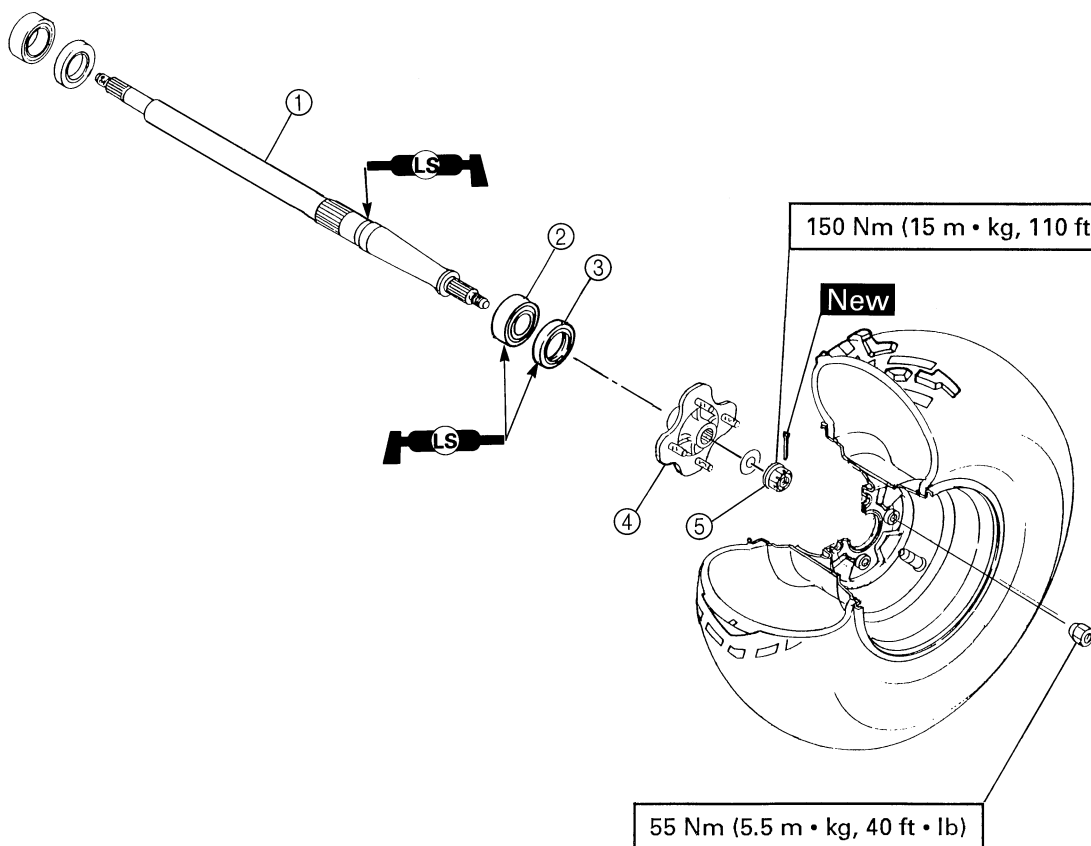




## REAR WHEELS/REAR BRAKE AND REAR AXLE

- ① Rear axle
- ② Bearing
- ③ Oil seal
- ④ Wheel hub
- ⑤ Axle nut

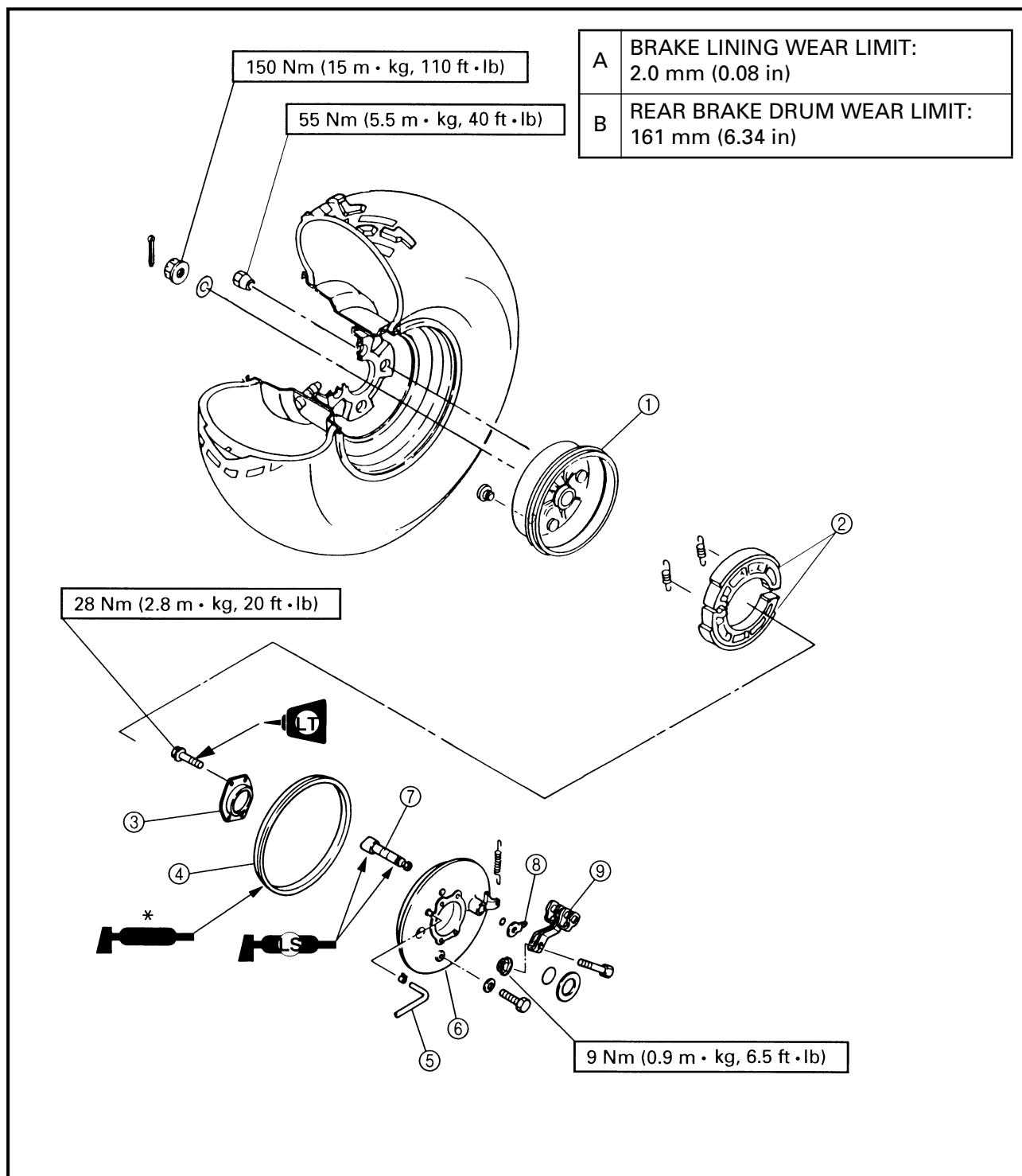
A	TIRE SIZE: AT22 × 10-10
B	RIM SIZE: 8 × 10
C	WHEEL RUNOUT LIMIT: VERTICAL: 2.0 mm (0.08 in)
D	TIRE WEAR LIMIT: 2.0 mm (0.08 in)
E	REAR AXLE RUNOUT LIMIT: 1.5 mm (0.06 in)

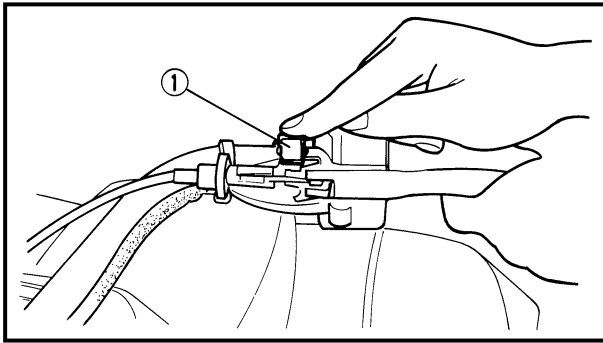




- ① Brake drum
- ② Brake shoe
- ③ Bearing retainer
- ④ Brake shoe plate seal
- ⑤ Rear brake breather hose
- ⑥ Brake shoe plate
- ⑦ Brake camshaft
- ⑧ Wear indicator plate
- ⑨ Brake camshaft lever

\* Yamaha brake grease



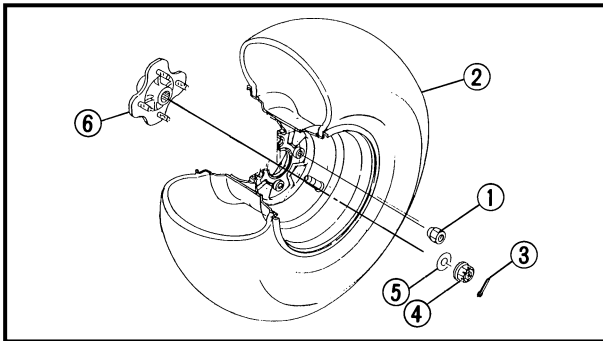


## REMOVAL

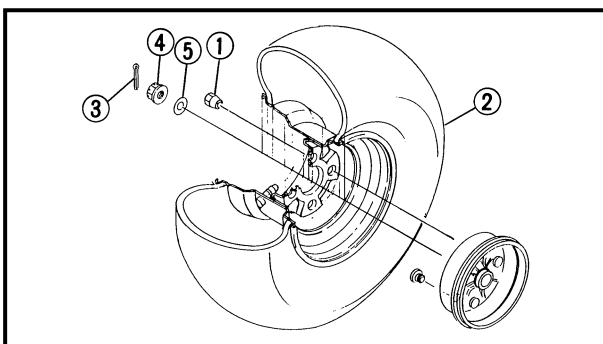
1. Place the machine on a level place.
2. Loosen:
  - Nuts (rear wheel)
 Apply the parking brake ①.
3. Block the front wheels, and elevate the rear wheels by placing the suitable stand under the frame.

## ⚠ WARNING

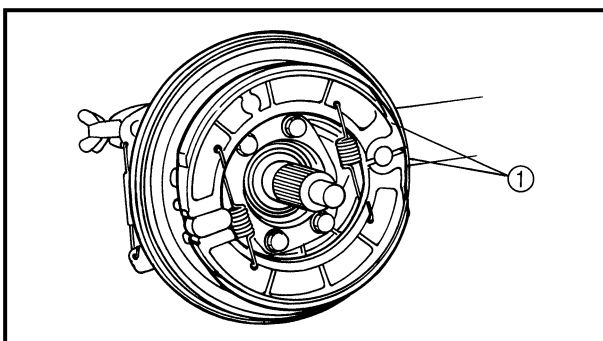
**Securely support the machine there is no danger of falling over.**



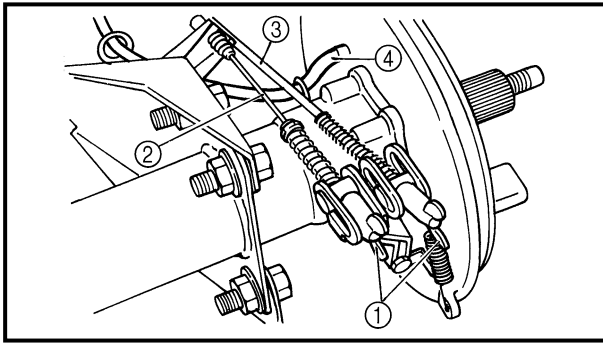
4. Remove:
  - Nuts ① (rear wheel)
  - Rear wheel ② (left)
  - Cotter pin ③
  - Nut ④
  - Washer ⑤
  - Wheel hub ⑥



5. Remove:
  - Nuts ① (rear wheel)
  - Rear wheel ② (right)
  - Cotter pin ③
  - Axle nut ④
  - Washer ⑤
6. Release the parking brake.



7. Remove:
  - Brake shoes ①

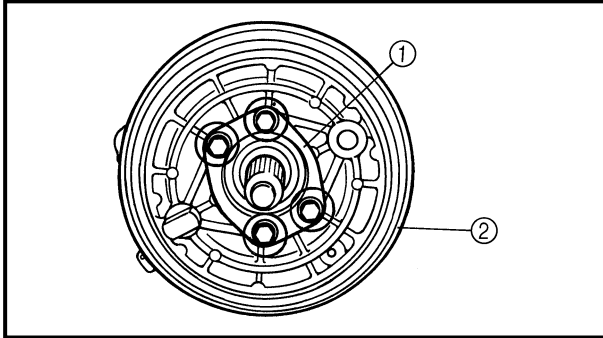


8.Remove:

- Adjusters ① (brake lever and brake pedal)
- Pins
- Springs

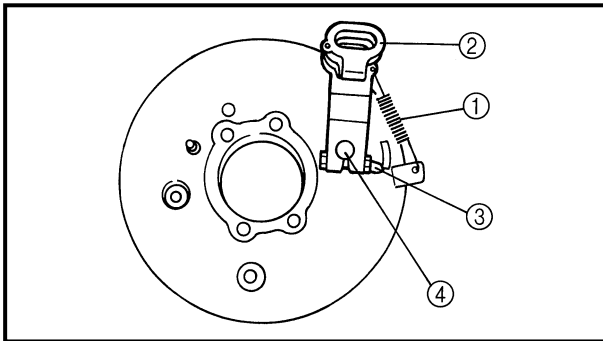
9.Disconnect:

- Brake cable ②
- Brake rod ③
- Rear brake breather hose ④



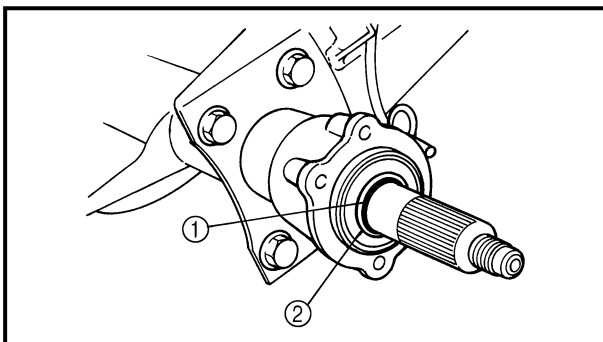
10.Remove:

- Bearing retainer ①
- Brake shoe plate assembly ②



11.Remove:

- Spring ①
- Brake camshaft lever ②
- Wear indicator plate ③
- Brake camshaft ④



12.Remove:

- O-ring ①
- Washer ②

13.Remove:

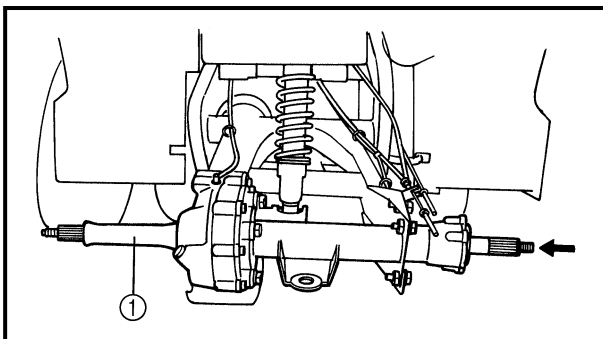
- Rear axle ①  
(tap on right side, pull out from left side)

## NOTE:

When removing the rear axle from the swing-arm and final gear case, use a soft hammer.

## CAUTION:

Never directly tap the axle and with a hammer, this will result in damage to the axle thread and spline.





## INSPECTION

### 1. Inspect:

- Wheel

Refer to the "WHEEL INSPECTION" section in CHAPTER 3.

### 2. Measure:

- Wheel runout

- Tire surfaces

Refer to the "FRONT WHEEL AND FRONT BRAKE-INSPECTION" section.

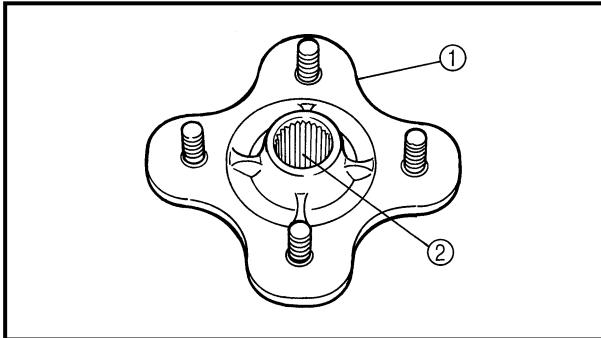
### 3. Inspect:

- Wheel hub ①

Cracks/Damage → Replace.

- Splines ② (wheel hub)

Wear/Damage → Replace.



### 4. Inspect:

- Brake linings

### 5. Measure:

- Brake lining thickness

Refer to the "FRONT WHEEL AND FRONT BRAKE-INSPECTION" section.



**Brake lining thickness:**

**4.0 mm (0.16 in)**

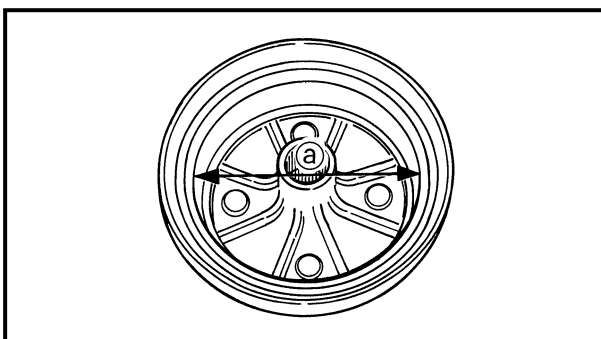
**<Wear limit>:**

**2.0 mm (0.08 in)**

### 6. Inspect:

- Shoe springs

Refer to the "FRONT WHEEL AND FRONT BRAKE-INSPECTION" section.



### 7. Measure:

- Brake drum inside diameter ①

Out of specification → Replace.

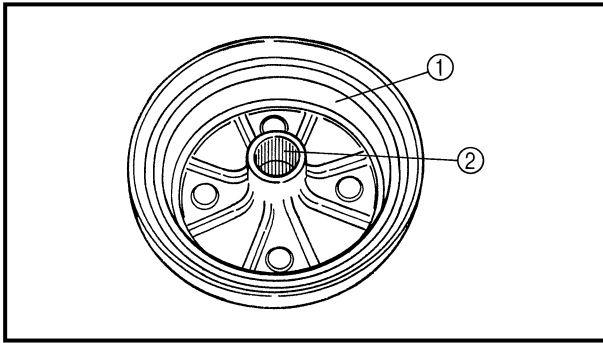


**Front brake drum inside diameter:**

**160 mm (6.30 in)**

**<Wear limit>:**

**161 mm (6.34 in)**

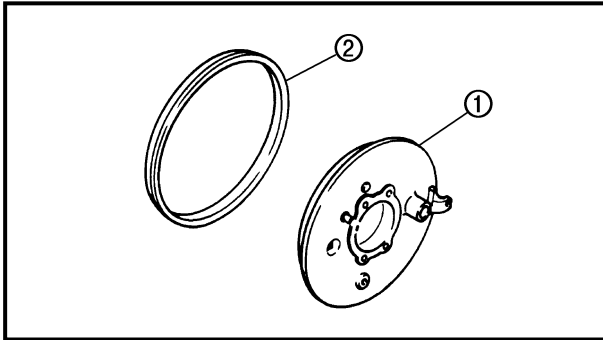


8. Inspect:

- Brake drum inner surface ①  
Oil/Scratches → Remove.

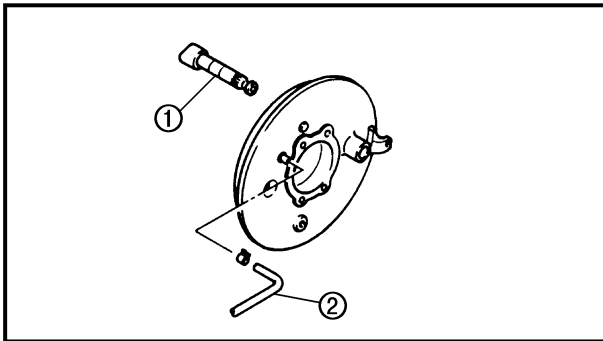
Oil	Use a rag soaked in lacquer thinner or a solvent.
Scratches	Use a emery cloth (lightly and evenly polishing).

- Spline ②  
Wear/Damage → Replace.



9. Inspect:

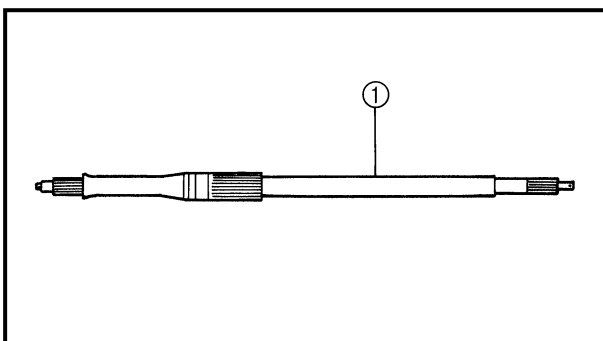
- Brake shoe plate ①  
Cracks/Bends/Damage → Replace.
- Dust seal ②  
Wear/Damage → Replace.



10. Inspect:

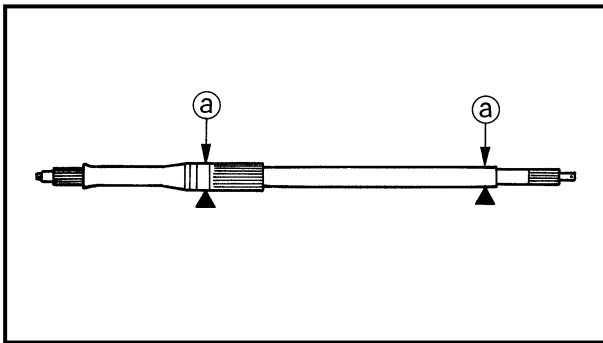
- Brake camshaft ①  
Wear/Scratches/Damage → Replace.
- Rear brake breather hose ②  
Obstruction → Remove.  
Damage → Replace.

11. Clean and blow out the rear brake breather hole of the brake shoe bracket with compressed air.



12. Inspect:

- Rear axle ①  
Scratched (excessively) /Damage → Replace.
- Splines/Threads (rear axle)  
Wear/Damage → Replace.



13.Measure:

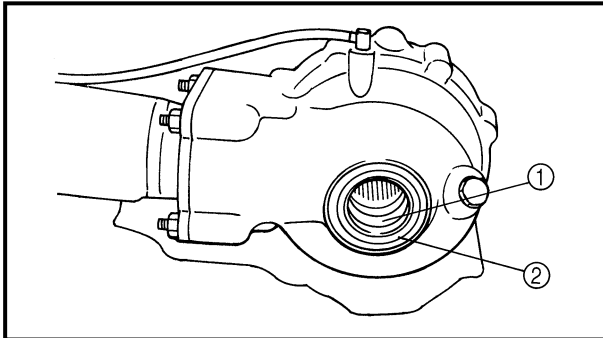
- Rear axle runout (a)  
Out of specification → Replace.



**Rear axle runout limit:**  
1.5 mm (0.06 in)

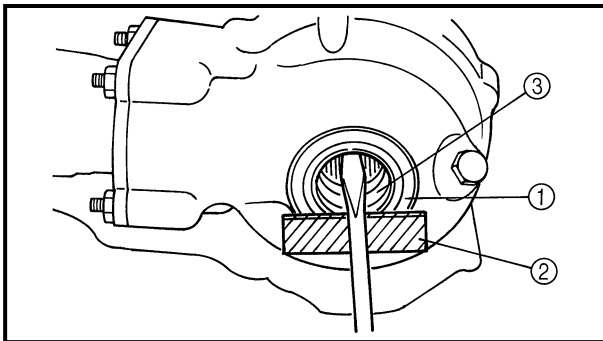
## ⚠ WARNING

**Do not attempt to straighten a bent axle.**



14.Inspect:

- Bearing (1) (rear axle)  
Bearing allow play in the axle hub or the bearing turns roughly → Replace.
- Oil seal (2)  
Wear/Damage → Replace.



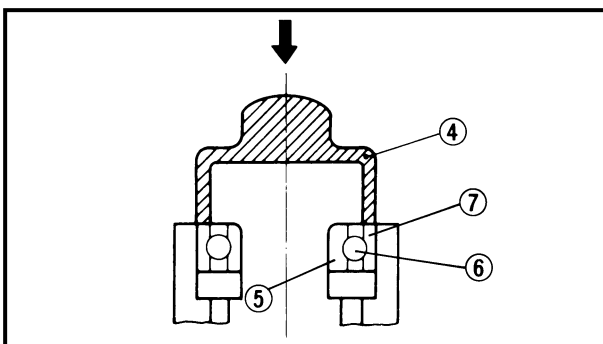
\*\*\*\*\*

## Bearing and oil seal replacement steps:

- Clean the area around the bearing on the final gear case.
- Remove the oil seal (1) use a flat-head screw driver.

## NOTE:

Place a wood block (2) on the outer edge to protect this edge.



- Remove the bearing (3) using a general bearing puller.
- Install the new bearing and oil seal by reversing the previous steps.

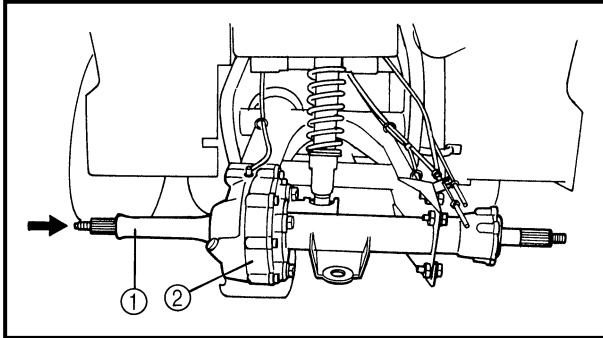
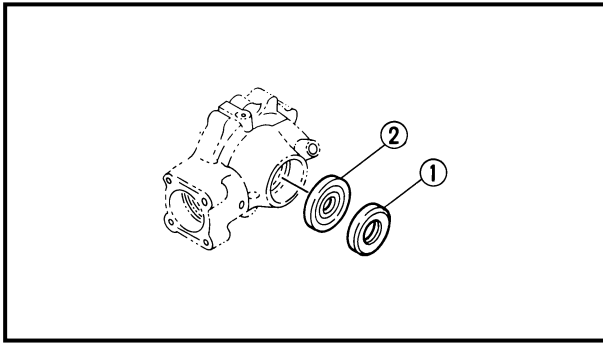
## NOTE:

Use a socket (4) that matches the outside diameter of the race of the bearing and oil seal.

## CAUTION:

**Do not strike the center race (5) or balls (6) of the bearing. Contact should be made only with the outer race (7).**

\*\*\*\*\*



### INSTALLATION

Reverse the "REMOVAL" procedures.

Note the following points.

#### 1.Lubricate:

- Oil seal lip ① (rear axle)
- Bearings ② (rear axle)
- Axle spline (rear axle)



**Lithium-soap base grease**

#### 2.Install:

- Rear axle ①

#### NOTE:

Before installing the rear axle, loosen all the bolts on the final gear case ②. Hold the rear axle ① with your hand, and slide it into the ring gear spline on the final gear case. Tap lightly on the left end rear axle with a soft hammer.

#### CAUTION:

**Never directly tap the axle end with a hammer, this will result in damage to the axle thread and spline.**

#### 3.Install:

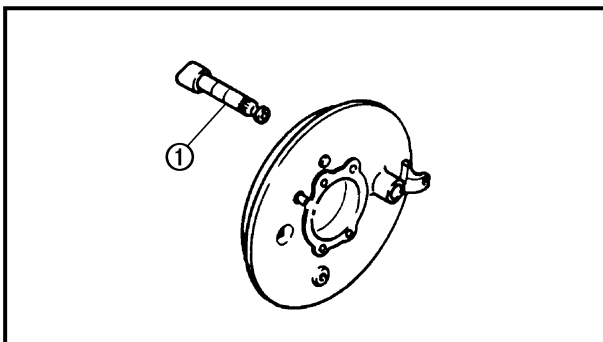
- Washer
- O-ring

#### 4.Lubricate:

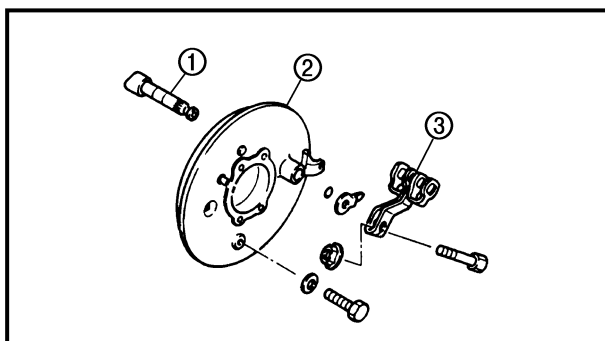
- Brake camshaft ①



**Lithium-soap base grease**

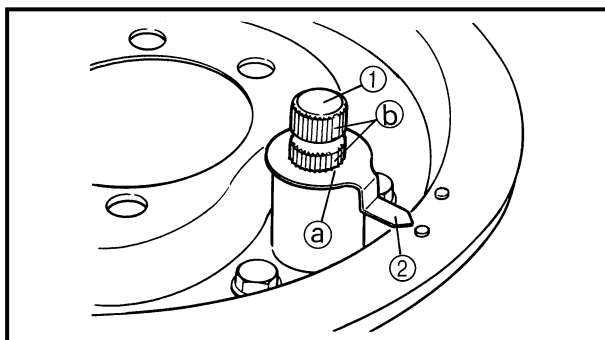






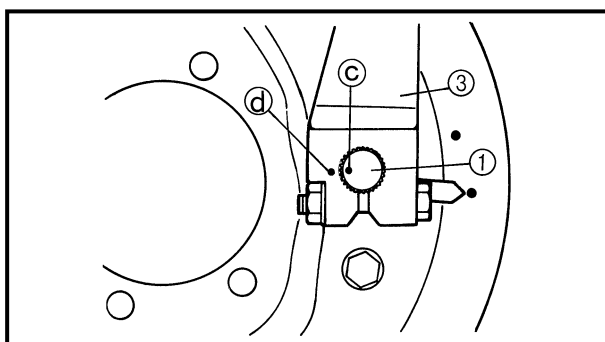
### 5.Install:

- Brake camshaft ①
- Wear indicator plate ②
- Brake camshaft lever ③

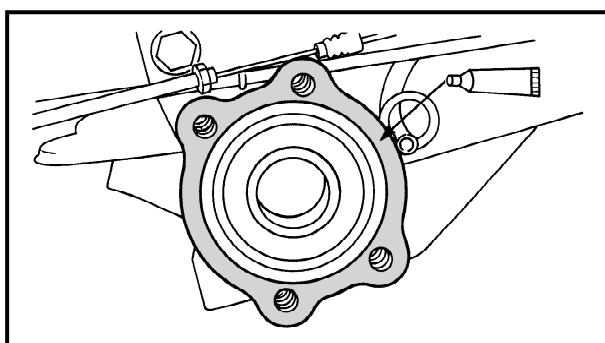


### NOTE:

- When installing the wear indicator plate ② to the brake camshaft ① align the projection (a) on the wear indicator plate with the slot (b) on the brake camshaft.
- Align the punched mark (c) on the brake camshaft ① with the punched mark (d) on the brake camshaft lever ③.



**Brake camshaft lever:**  
9 Nm (0.9 m • kg, 6.5 ft • lb)

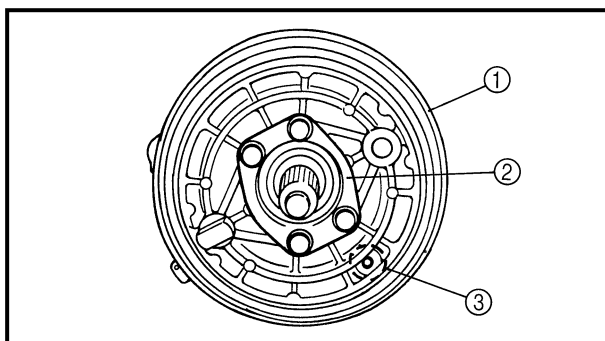


### 6.Apply:

- Sealant  
(to matching surface of brake shoe plate and swingarm)



**Sealant (Quick Gasket®)**  
P/N. ACC-QUICK-GS-KT  
Yamaha bond No. 1215  
P/N. 90890-85505

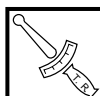


### 7.Install:

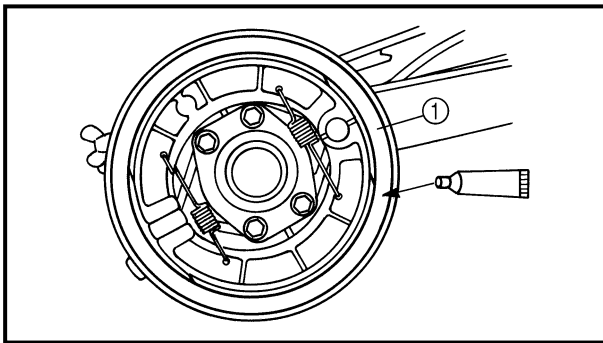
- Brake shoe plate assembly ①
- Bearing retainer ②

### NOTE:

The brake shoe plate should be installed with the drain bolt ③ downward.



**Bolt (brake shoe plate):**  
28 Nm (2.8 m • kg, 20 ft • lb)



8.Install:

- Brake shoes

9.Lubricate:

- Dust seal ① (backing plate)



**Yamaha brake grease**  
P/N. 90793-40003

### CAUTION:

**Do not apply grease to the brake shoe linings.**

- Brake drum spline



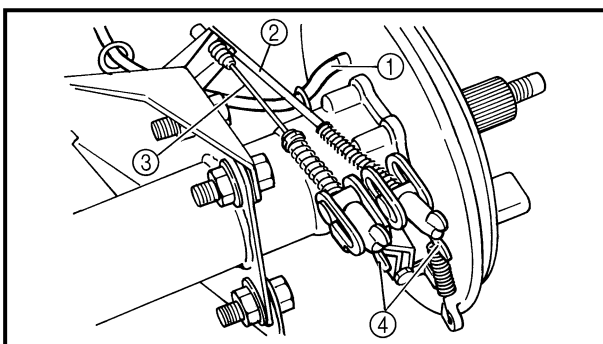
**Lithium-soap base grease**

### CAUTION:

**Do not apply grease on the axle shaft spline, or the extra grease may contaminate the brake shoes during running.**

10.Install:

- Brake drum

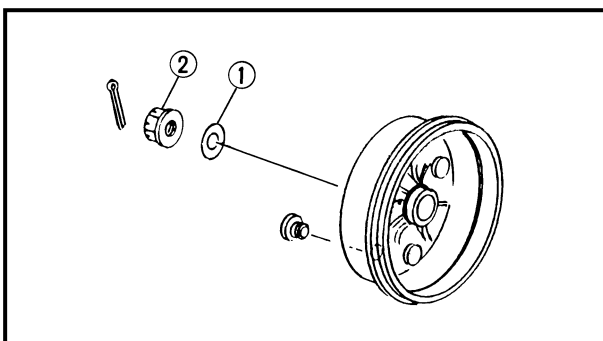


11.Connect:

- Rear brake breather hose ①
- Brake rod ②
- Brake cable ③

12.Install:

- Springs
- Pins
- Adjusters ④ (brake lever and brake pedal)



13.Install:

- Washer ①
- Nut ②

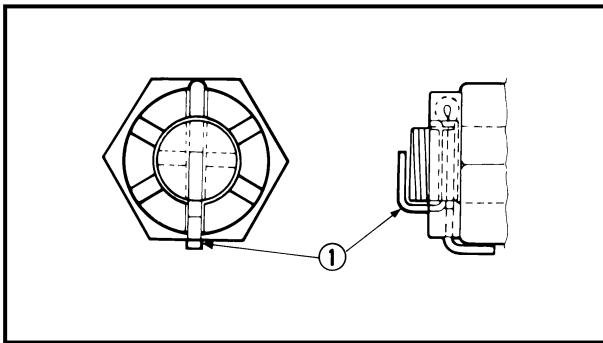
14.Apply the parking brake.

15.Tighten

- Nut ②



**Nut (wheel hub):**  
**150 Nm (15 m • kg, 110 ft • lb)**



16.Install:

- Cotter pin ①

**NOTE:**

Do not loosen the axle nut after torque tightening. If the axle nut groove is not aligned with the cotter pin hole, align groove with the hole by tightening up on the axle nut.

**⚠ WARNING**

**Always use a new cotter pin.**

17.Install:

- Rear wheel ① (right)
- Nuts ②



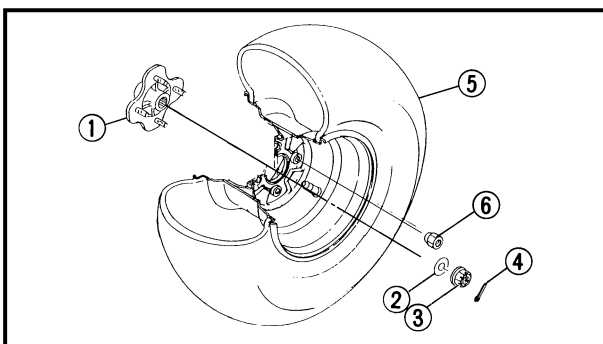
**Nuts (wheel panel):**  
**55 Nm (5.5 m • kg, 40 ft • lb)**

**NOTE:**

Arrow mark on the tire must point toward the rotating direction of the wheel. Refer to the "FRONT WHEEL AND FRONT BRAKE - INSTALLATION" section.

**⚠ WARNING**

**Tapered wheel nuts ② are used for rear wheels. Install the nuts with its tapered side facing the wheel.**



18.Install:

- Wheel hub ①
- Washer ②
- Nut ③
- Cotter pin ④
- Rear wheel ⑤ (left)
- Nuts ⑥ (wheel panel)

Refer to the "Rear wheel (right)" section.

19.Adjust:

- Rear brake pedal free play
  - Rear brake cable free play
- Refer to the "REAR BRAKE AND PEDAL ADJUSTMENT" section in CHAPTER 3.

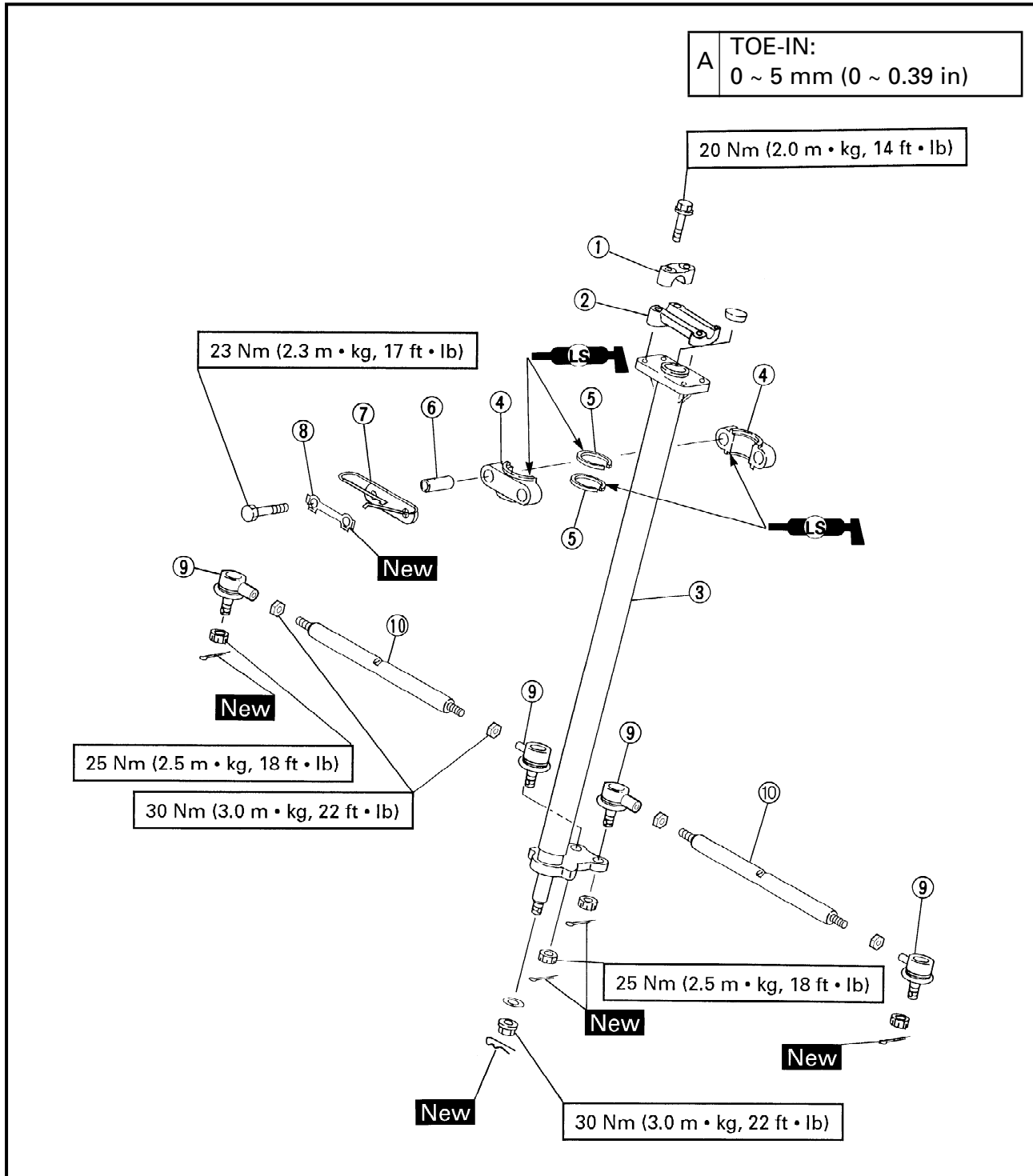


**Rear brake pedal free play:**  
**20 ~ 30 mm (0.78 ~ 1.18 in)**  
**Rear brake lever free play:**  
**5.0 ~ 8.0 mm (0.20 ~ 0.31 in) at lever pivot**



## STEERING SYSTEM

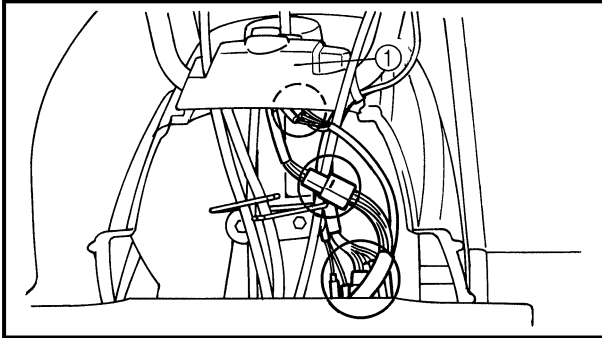
- ① Handlebar holder (upper)
- ② Handlebar holder (lower)
- ③ Steering shaft
- ④ Steering bearing
- ⑤ Oil seal
- ⑥ Collar
- ⑦ Cable guide
- ⑧ Lock washer
- ⑨ Rod end
- ⑩ Tie-rod



**REMOVAL****Handlebar****1.Remove:**

- Front carrier
- Front bumper
- Front fender

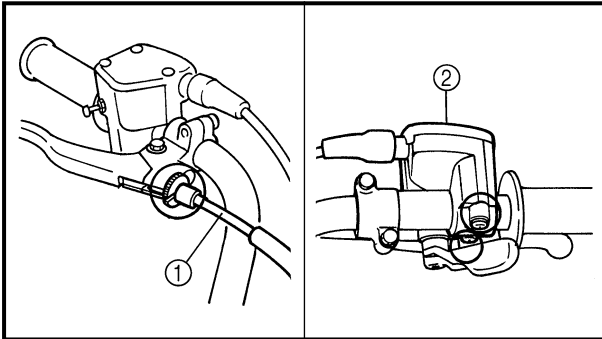
Refer to "FENDERS AND FUEL TANK-FRONT FENDER-Removal" section in CHAPTER 3.

**2.Disconnect:**

- Main switch lead
- "NEUTRAL" indicator light leads
- "REVERSE" indicator light leads
- Handlebar switch (left) leads
- Brake switch leads

**3.Remove:**

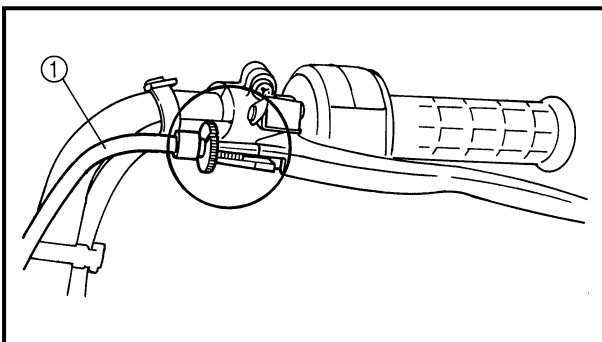
- Handle protector ①

**4.Disconnect:**

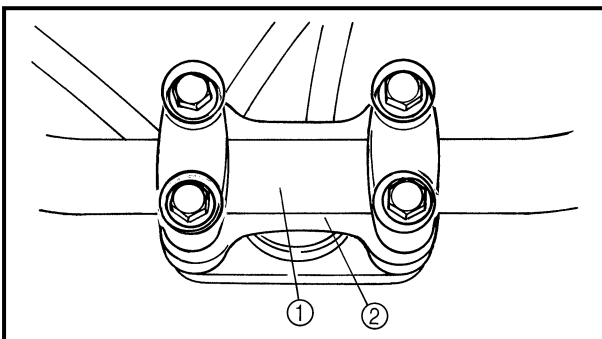
- Front brake cable ①

**5.Remove:**

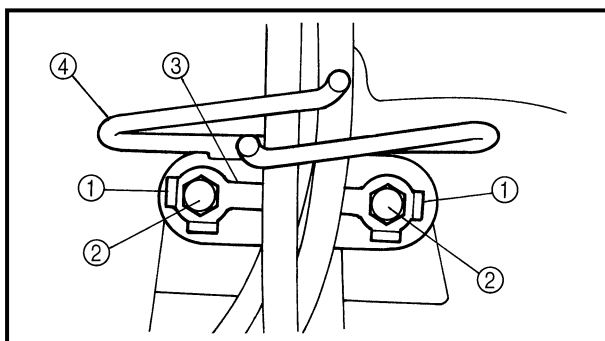
- Throttle lever assembly ②

**6.Disconnect:**

- Brake cable ① (parking)

**7.Remove:**

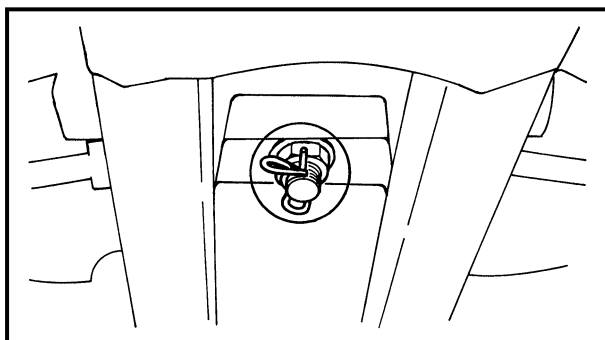
- Handlebar ①
- Handlebar holder ② (lower)

**Steering shaft****1.Straighten:**

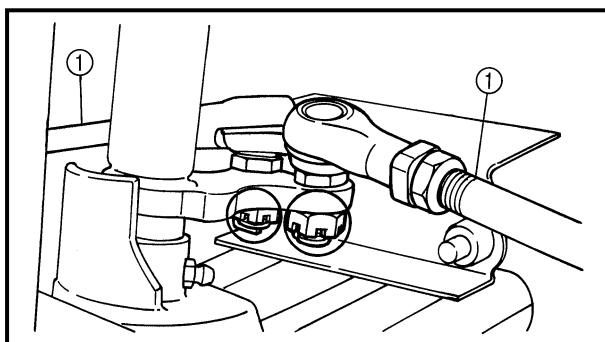
- Lock washer tabs ①

**2.Remove:**

- Bolts ②
- Lock washer ③
- Cable guide ④

**3.Remove:**

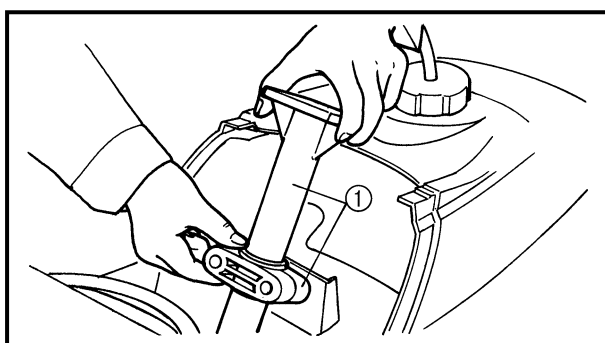
- Clip (steering shaft)
- Nut
- Washer

**4.Remove:**

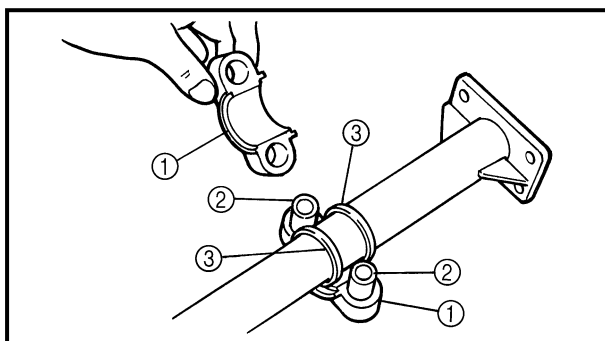
- Cotter pins
- Nuts
- Tie-rods ①

**NOTE:**

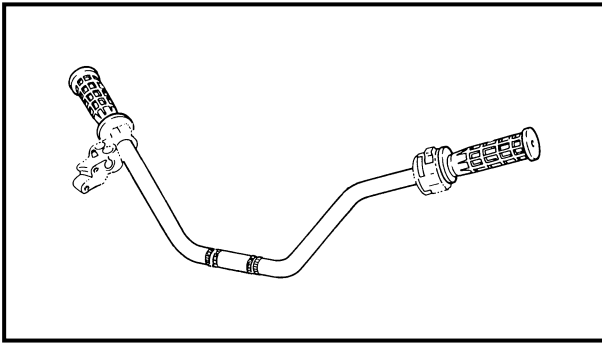
When removing the rod ends from the steering shaft and knuckle arm, use a General Bearing Puller.

**5.Remove:**

- Steering shaft ① (with steering bearings) (from upside)

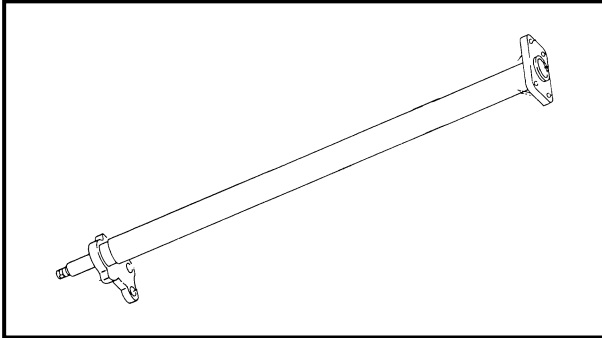
**6.Remove:**

- Steering bearings ①
- Collars ②
- Oil seals ③

**INSPECTION**

1. Inspect:

- Handlebar  
Cracks/Bends/Damage → Replace.

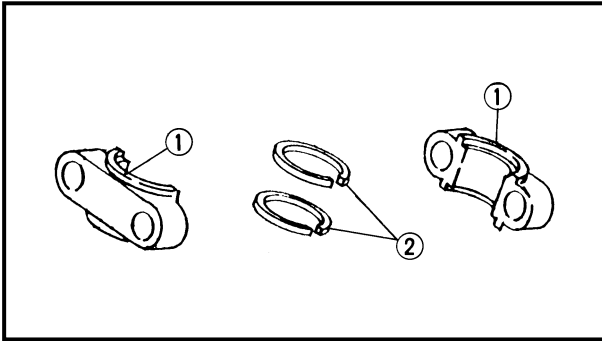


2. Inspect:

- Steering shaft  
Bends/Damage → Replace.

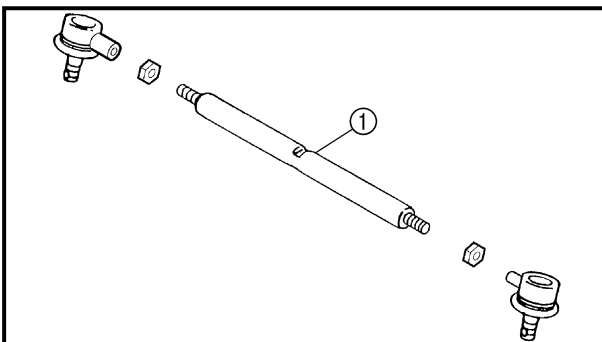
**⚠ WARNING**

**Do not attempt to straighten a bent shaft; this may dangerously weaken the shaft.**



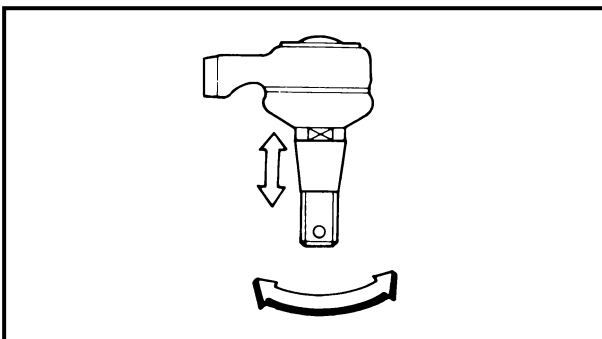
3. Inspect:

- Steering bearings ①
- Oil seals ②  
Wear/Damage → Replace.



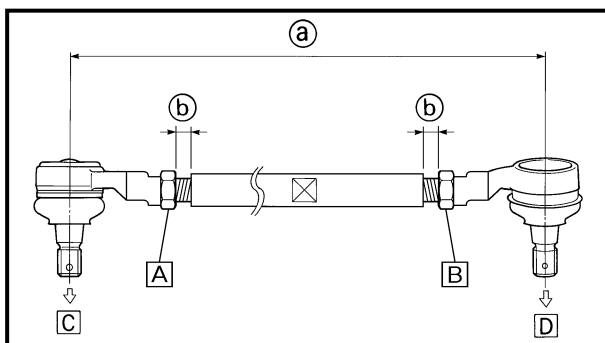
4. Inspect:

- Tie-rod ①  
Bend/Damage → Replace.



5. Check:

- Rod end movement  
Rod end exists free play → Replace.  
Rod end turns roughly → Replace.
- Tapered surface (rod end)  
Pitting/Wear/Damage → Replace.



## 6.Adjust:

- Tie-rod assembly length

\*\*\*\*\*

**Tie-rod assembly length adjustment steps:**

- Loosen the locknuts.
- Adjust the tie-rod assembly length a by turning both tie-rod ends.



**Tie-rod assembly length ①:**  
**296 mm (11.7 in)**

- Ⓐ Right-hand-threads
- Ⓑ Left-hand-threads
- Ⓒ To steering shaft
- Ⓓ To knuckle

**NOTE:**

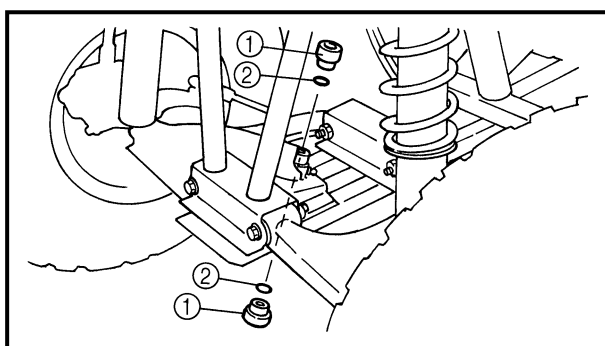
The threads ② on both tie-rod ends must be of the same length.

- Tighten the locknuts.



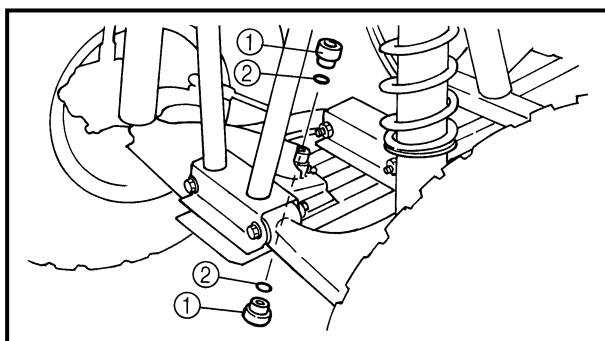
**Locknut (tie-rod):**  
**30 Nm (3.0 m • kg, 22 ft • lb)**

\*\*\*\*\*



## 7.Inspect:

- Bushings ① (steering shaft lower)
  - O-rings ②
- Wear/Damage → Replace.

**INSTALLATION**

Reverse the "REMOVAL" procedures.  
Note the following points.

**Steering shaft**

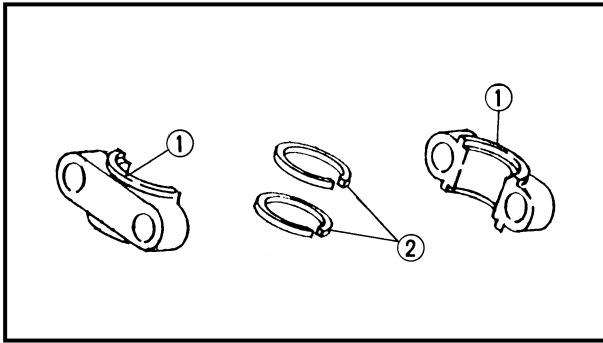
## 1.Lubricate:

- Busing ① (steering shaft lower)
- O-rings ②



**Lithium-soap base grease**



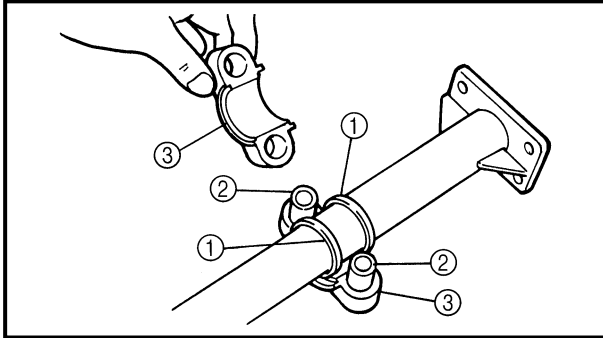


## 2.Lubricate:

- Steering bearings ①
- Oil seals ②



**Lithium-soap base grease**

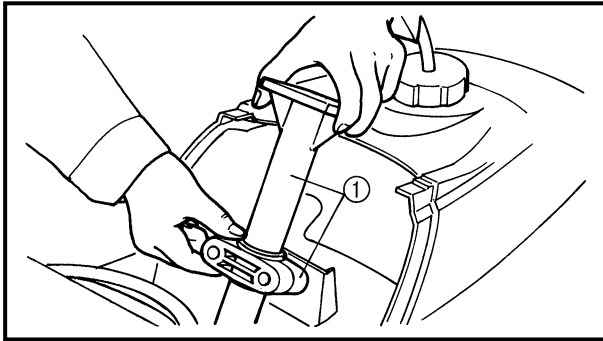


## 3.Install:

- Oil seals ① (to steering shaft)
- Collars ②
- Steering bearings ③

**NOTE:**

Be careful not to damage the oil seals during installation.

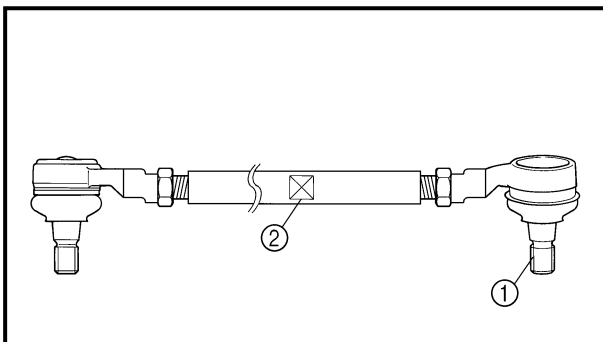


## 4.Install:

- Steering shaft ① (with steering bearings)

**⚠ WARNING**

**Make sure the brake cables and leads are properly routed, and are not damaged or twisted.**

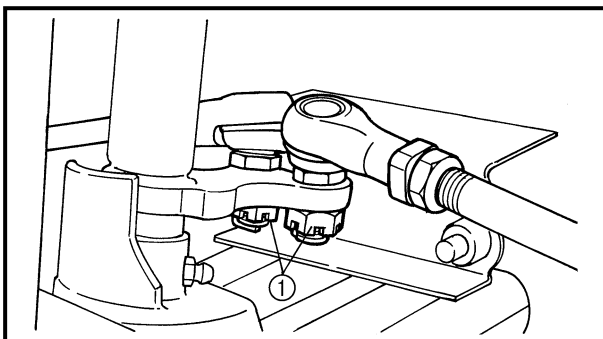


## 5.Install:

- Tie-rods (left and right)

**NOTE:**

Be sure that the rod-end ① on the indentation ② side is connected to the knuckle arm.

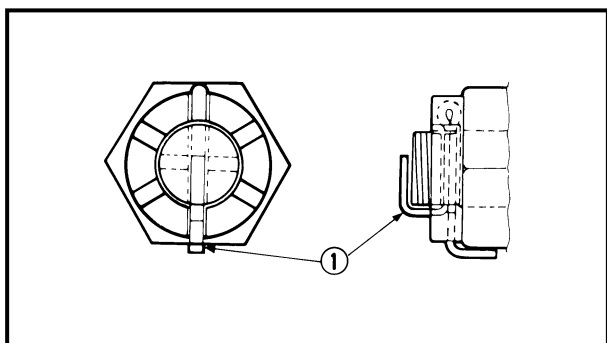


## 6.Tighten:

- Nuts ① (tie-rod end)



**Nut (tie-rod):**  
**25 Nm (2.5 m • kg, 18 ft • lb)**



7.Install:

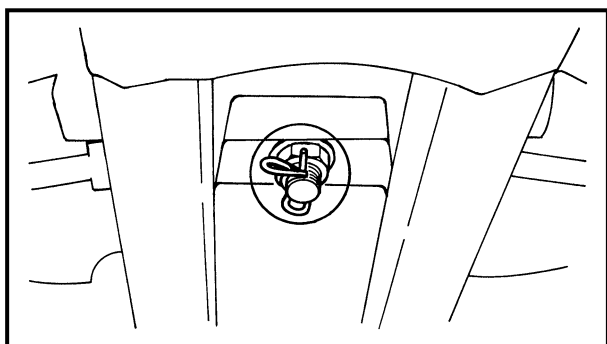
- Cotter pin ①

**NOTE:**

Do not loosen the axle nut after torque tightening. If the axle nut groove is not aligned with the cotter pin hole, align groove with the hole by tightening up on the axle nut.

**⚠ WARNING**

**Always use a new cotter pin.**

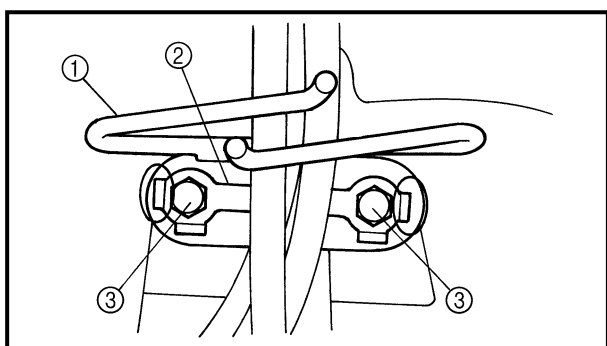


8.Tighten:

- Washer
- Nut
- Clip



**Nut (steering shaft):**  
30 Nm (3.0 m • kg, 22 ft • lb)



9.Install:

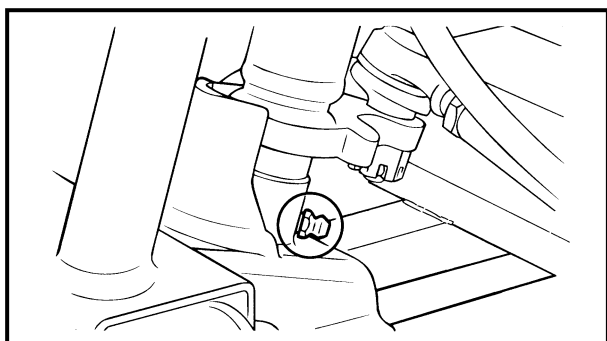
- Cable guide ①
- Lock washer ②
- Bolts ③



**Bolt (bearing holder):**  
23 Nm (2.3 m • kg, 17 ft • lb)

**⚠ WARNING**

**Always use a new lock washer.**



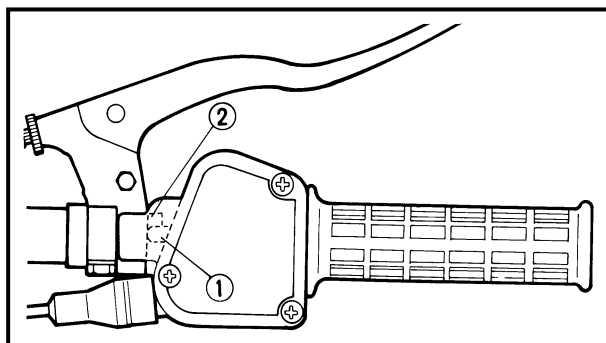
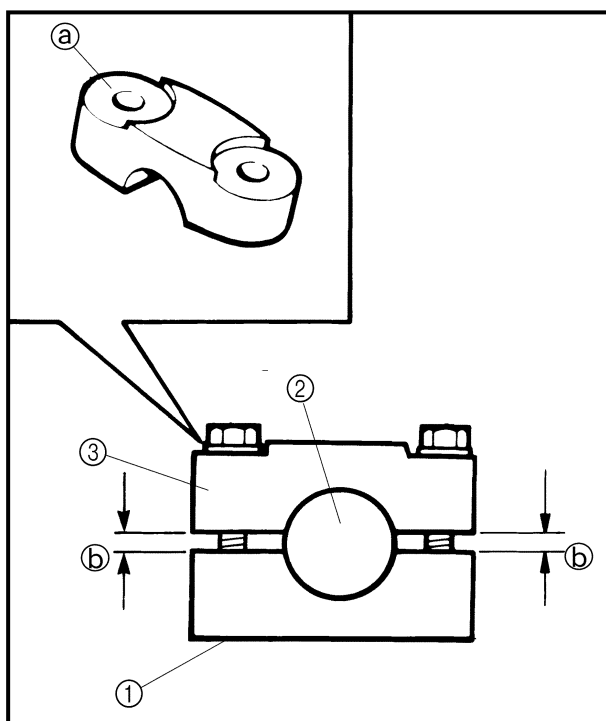
10.Bend the lock washer tabs.

11.Lubricate:

- Bushing (steering shaft)



**Lithium-soap base grease**



### Handlebar

#### 1.Install:

- Handlebar holder (lower) ①
- Handlebar ②
- Handlebar holders (upper) ③

#### NOTE:

The upper handlebar holder should be installed with the punched mark ③ forward ②.

#### CAUTION:

Tighten the handlebar bolts so that clearances ④ are spaced evenly.



Handlebar holder (upper):  
20 Nm (2.0 m • kg, 14 ft • lb)

#### 2.Install:

- Throttle lever assembly

#### NOTE:

Fit the throttle housing projection ① onto the indent ② on the front brake lever holder.

#### ⚠ WARNING

Proper cable and lead routing is essential to assure safe machine operation. Refer to the "CABLE ROUTING" section in CHAPTER 2.

#### 3.Adjust:

- Brake cable free play  
Refer to the "FRONT BRAKE ADJUSTMENT" and "REAR BRAKE LEVER AND PEDAL ADJUSTMENT" section in CHAPTER 3.

#### 4.Adjust:

- Toe-in  
Refer to the "TOE-IN ADJUSTMENT" section in CHAPTER 3.

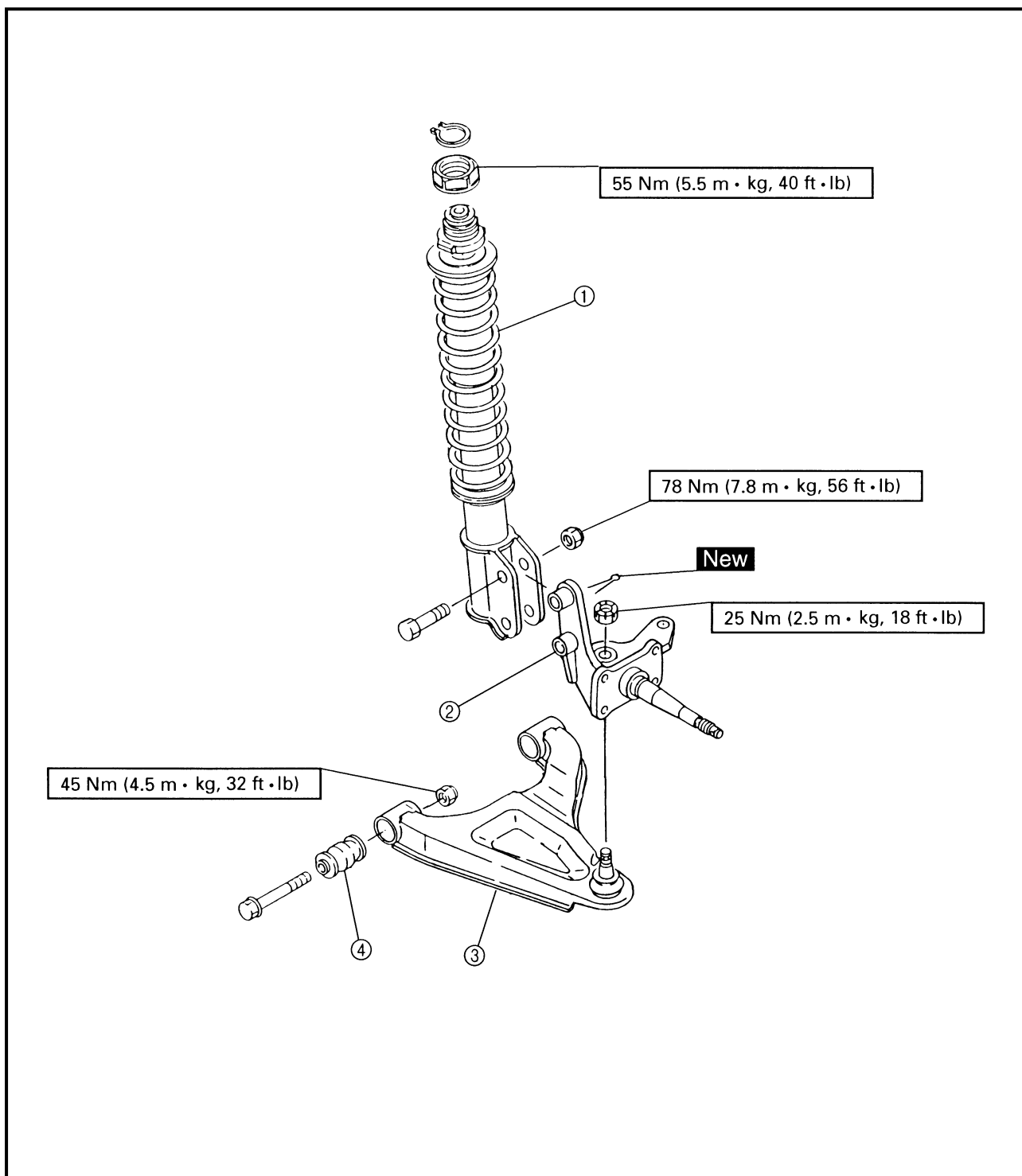
#### 5.Install:

- Front fender
- Front bumper
- Front carrier (except for USA)  
Refer to the "FENDERS AND FUEL TANK —FRONT FENDER-Installation" section in CHAPTER 3.



## FRONT SHOCK ABSORBER AND FRONT ARM

- ① Front shock absorber
- ② Steering knuckle
- ③ Lower arm
- ④ Bushing





## REMOVAL

### 1.Remove:

- Front carrier
- Front bumper
- Front fender

Refer to the "FENDERS AND FUEL TANK-FRONT FENDER - Removal" section in CHAPTER 3.

- Front wheel
- Brake drum
- Brake shoe plate

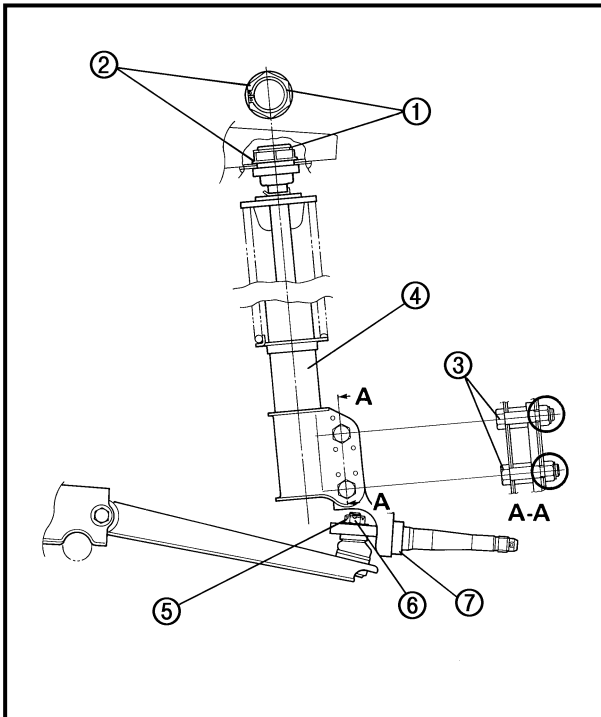
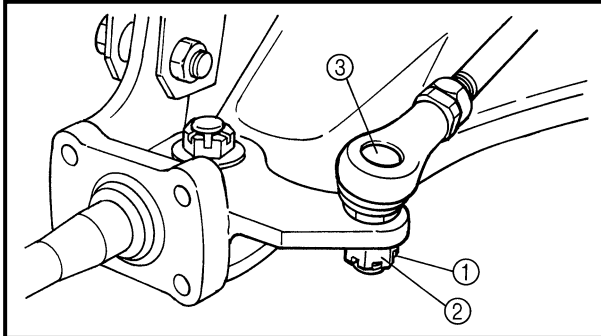
Refer to "FRONT WHEELS AND FRONT BRAKE - Removal" section.

### 2.Remove:

- Cotter pin ①
- Nut ②
- Tie-rod end ③

### NOTE:

When removing the rod end from the knuckle arm, use a general bearing puller.



### 3.Remove:

- Circlip (shock absorber upper) ①

### 4.Loosen:

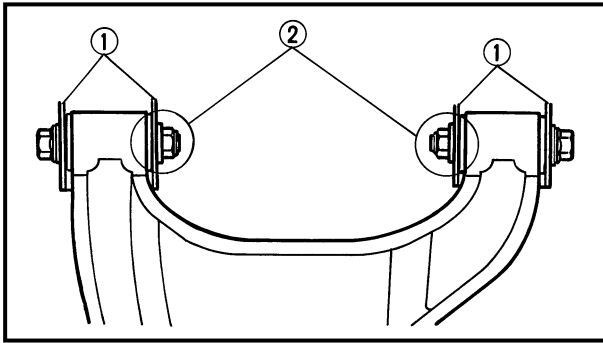
- Flange nut ②  
41 mm (1.6 in)

### 5.Remove:

- Bolts (shock absorber lower) ③
- Flange nut ②
- Shock absorber ④ (front)

### 6.Remove:

- Cotter pin ⑤
- Nut ⑥ (steering knuckle)
- Steering knuckle ⑦



## 7. Inspect:

- Lower arms free play

\*\*\*\*\*

## Inspection steps:

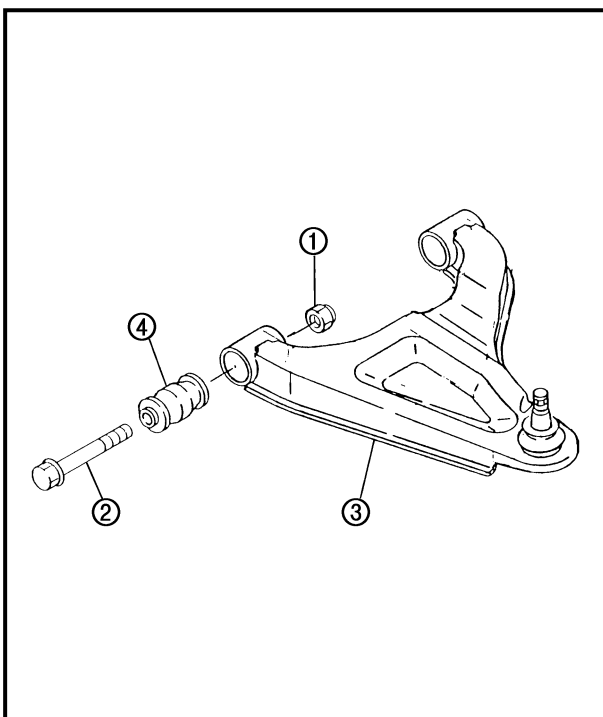
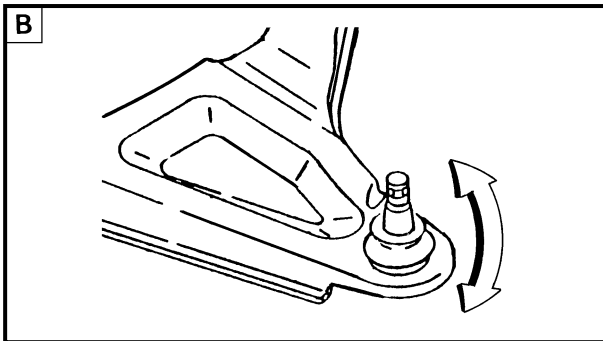
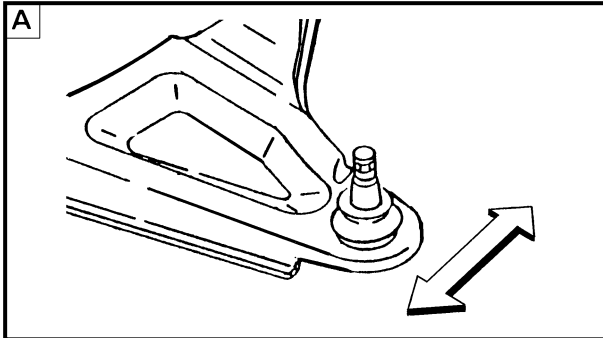
- Inspect the lower arm brackets ① of the frame.  
If bent, cracked or damaged, repair or replace the frame.
- Check the tightening torque of the lower arm securing nuts ②.



**Nut (lower arm):**  
**45 Nm (4.5 m • kg, 32 ft • lb)**

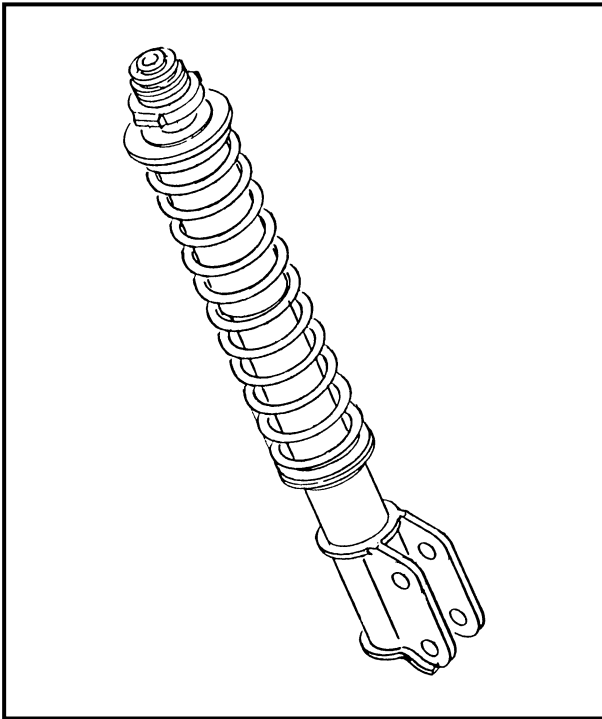
- Check the lower arm side play **A** by moving it from side to side. If side play noticeable, replace the bushings or lower arm as a set.
- Check the lower arm vertical movement **B** by moving it up and down.  
If vertical movement is tight, binding or rough, replace the bushings or lower arm as a set.

\*\*\*\*\*



## 8. Remove:

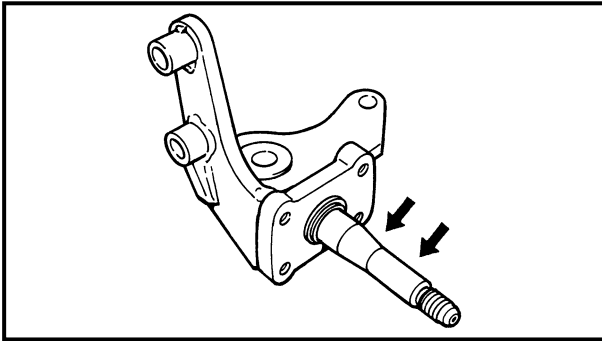
- Nuts ①
- Bolts ②
- Lower arm ③
- Bushings ④



## INSPECTION

### 1. Inspect:

- Shock absorber  
Oil leaks → Replace the shock absorber assembly.
- Ball joint  
Cracks/Damage → Replace the shock absorber assembly.
- Spring  
Fatigue/Damage → Replace the shock absorber assembly.  
Move the spring up and down.

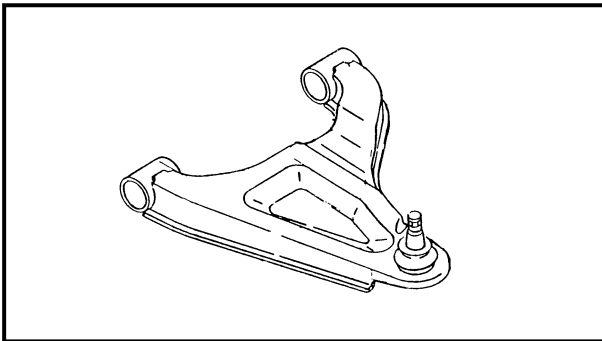


### 2. Inspect:

- Steering knuckle  
Cracks/Pitting/Damage → Replace.

### **⚠ WARNING**

**Do not attempt to straighten a bent shaft; this may dangerously weaken the shaft.**

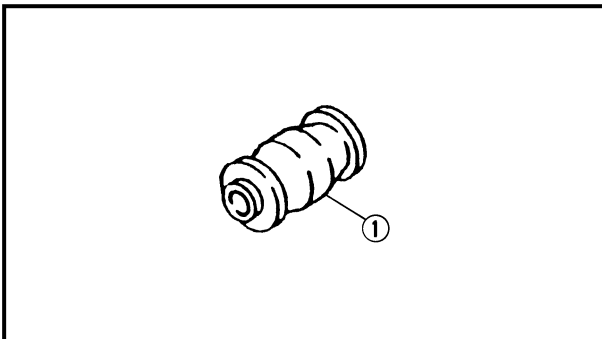


### 3. Inspect:

- Lower arm  
Cracks/Bends/Damage → Replace.

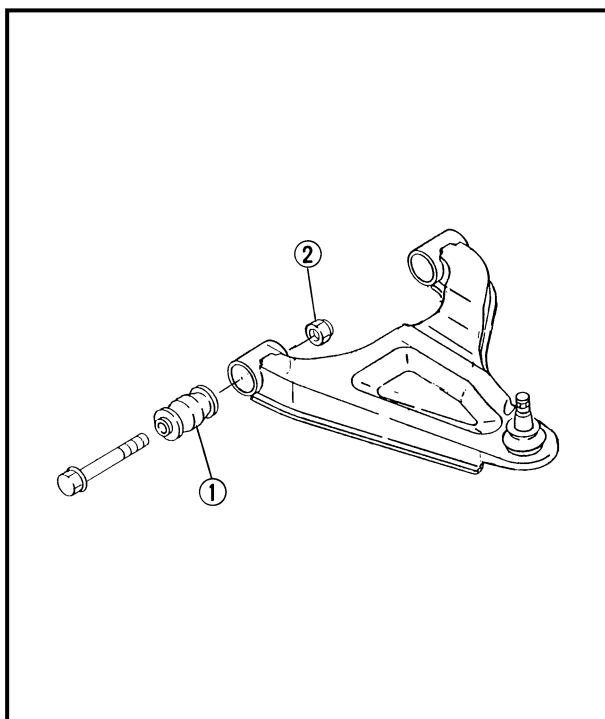
### **⚠ WARNING**

**Do not attempt to straighten a bent arm; this may dangerously weaken the arm.**



### 4. Inspect:

- Bushings ①  
Wear/Damage → Replace as a set.



### INSTALLATION

Reverse the "REMOVAL" procedures.

Note the following points.

1.Lubricate:

- Bushings ① (inner surface)



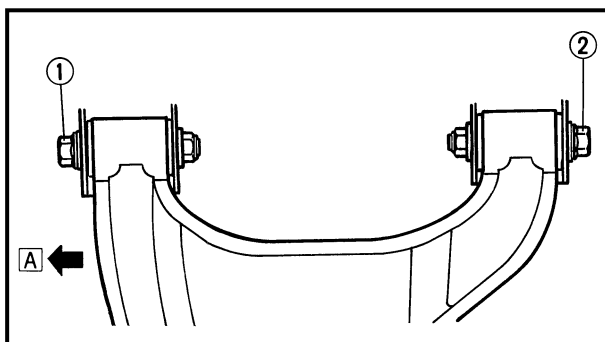
**Lithium-soap base grease**

2.Tighten:

- Nut ② (lower arm)



**Nut (lower arm):**  
**45 Nm (4.5 m • kg, 32 ft • lb)**



### NOTE:

Be sure to position the front arm securing bolts (front ① and rear ②) so that the bolt heads will face outward.

**A** Forward

3.Install:

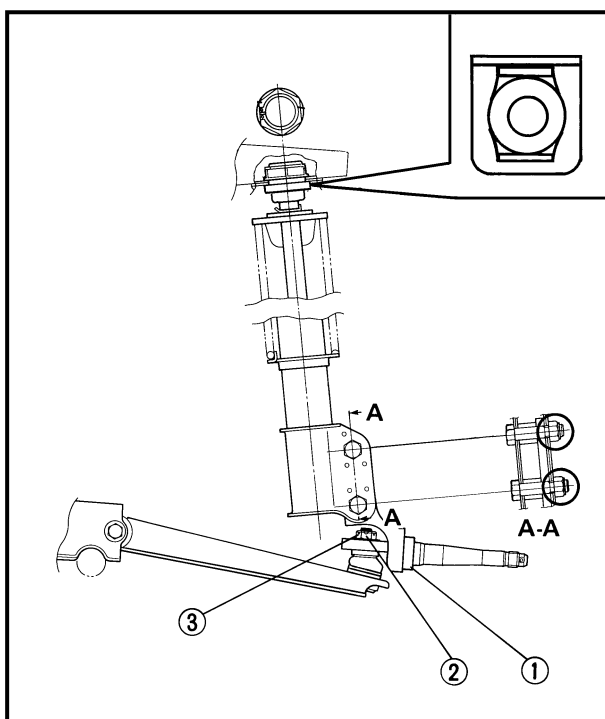
- Steering knuckle ①

4.Tighten:

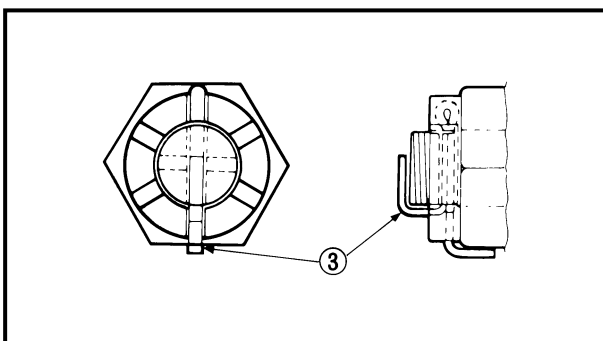
- Nut ② (steering knuckle)



**Nut (steering knuckle):**  
**25 Nm (2.5 m • kg, 18 ft • lb)**







5.Install:

- Cotter pin ③

**NOTE:**

Do not loosen the axle nut after torque tightening. If the axle nut groove is not aligned with the cotter pin hole, align groove with the hole by tightening up on the axle nut.

**⚠ WARNING**

**Always use a new cotter pin.**

6.Install:

- Shock absorber ④ (front)
- Flange nut ⑤ (shock absorber upper)
- Bolts ⑥ (shock absorber lower)

**NOTE:**

- Make sure the flat sides ⑧ of the ball joint ⑦ are firmly held by the frame before tightening the flange nut ⑤.
- Be sure to position the shock absorber securing bolts (lower ⑥) so that the bolts head will face forward.

7.Tighten:

- Flange nut ⑤
- Bolts ⑥



**Flange nut:**

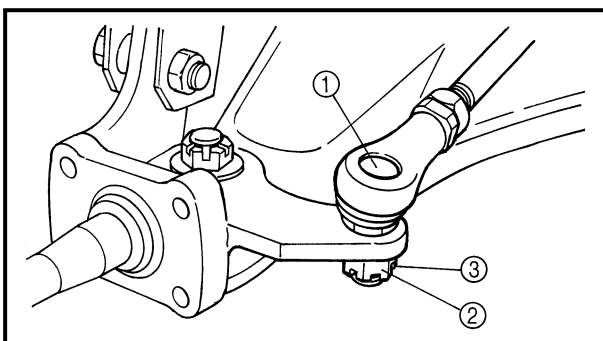
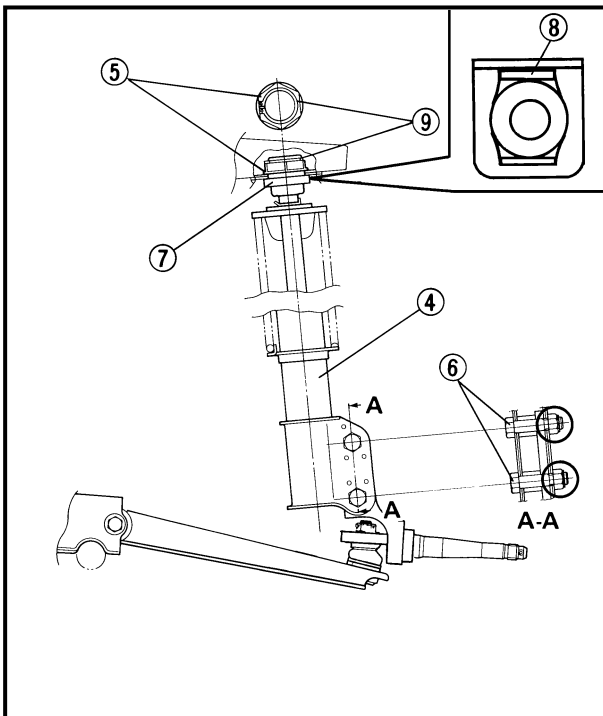
**55 Nm (5.5 m • kg, 40 ft • lb)**

**Bolts:**

**78 Nm (7.8 m • kg, 56 ft • lb)**

8.Install:

- Circlip ⑨



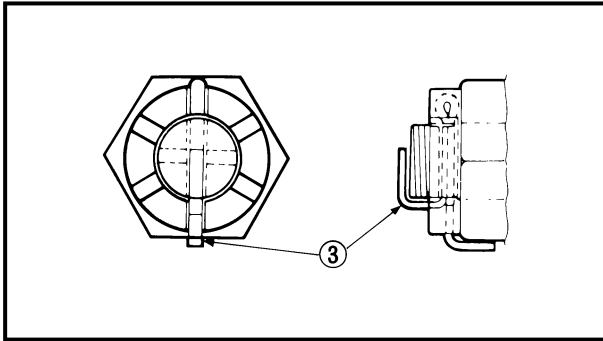
9.Install:

- Tie-rod end ①
- Nut ② (tie-rod end)
- Cotter pin ③



**Nut (tie-rod):**

**25 Nm (2.5 m • kg, 18 ft • lb)**



## NOTE:

Do not loosen the axle nut after torque tightening. If the axle nut groove is not aligned with the cotter pin hole, align groove with the hole by tightening up on the axle nut.

## ⚠ WARNING

**Always use a new cotter pin.**

### 10.Install:

- Brake shoe plate
- Brake drum
- Front wheel

Refer to the "FRONT WHEELS AND FRONT BRAKE-INSTALLATION" section.

### 11.Adjust:

- Toe-in

Refer to the "TOE-IN ADJUSTMENT" section in CHAPTER 3.

### 12.Install:

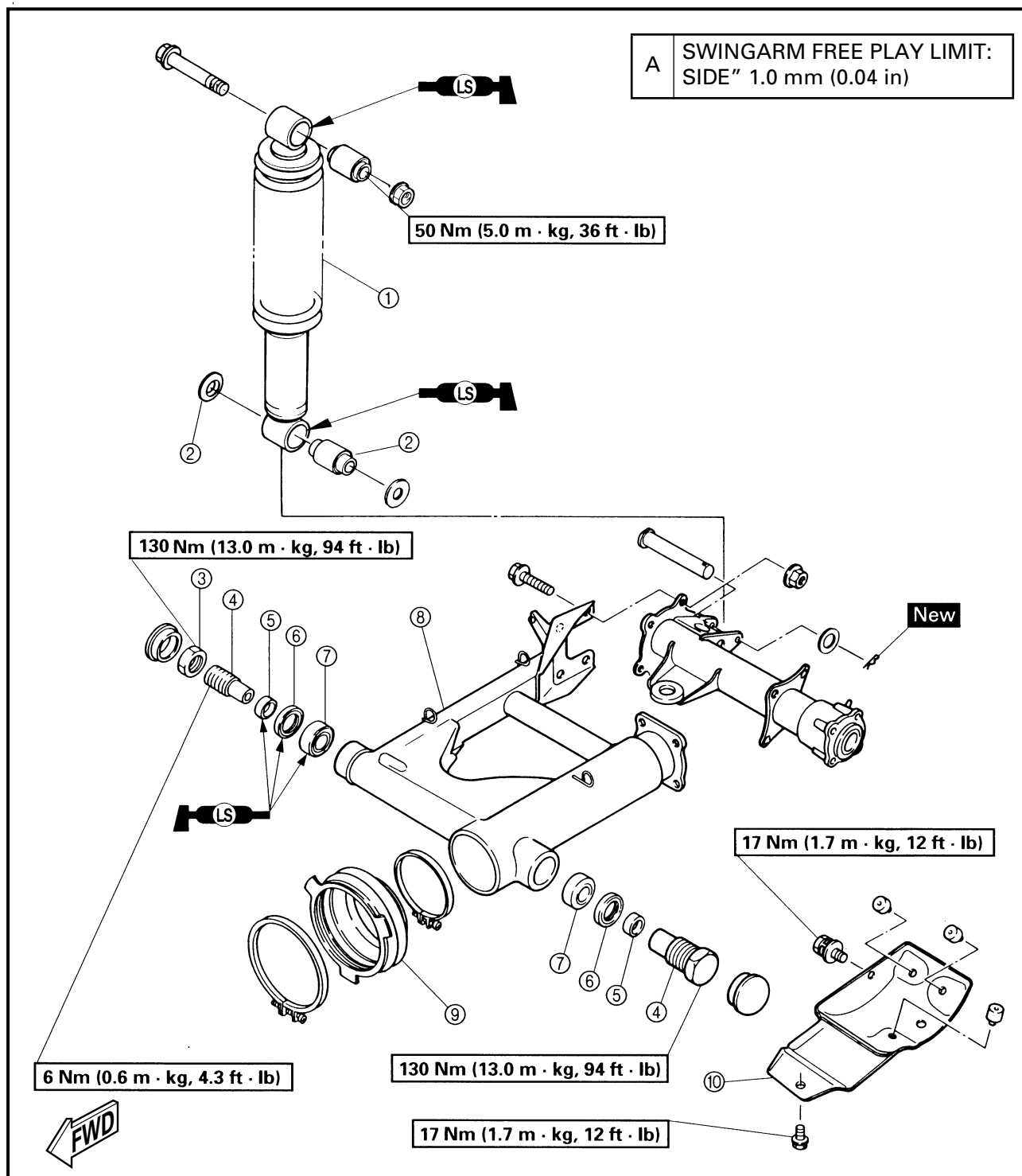
- Front fender
- Front bumper
- Front carrier

Refer to the "FENDERS AND FUEL TANK-FRONT FENDER - Installation" section in CHAPTER 3.



## REAR SHOCK ABSORBER AND SWINGARM

- ① Rear shock absorber
- ② Thrust cover
- ③ Locknut
- ④ Pivot shaft
- ⑤ Collar
- ⑥ Oil seal
- ⑦ Taper roller bearing
- ⑧ Swingarm
- ⑨ Rubber boot
- ⑩ Final gear case protector





## REMOVAL

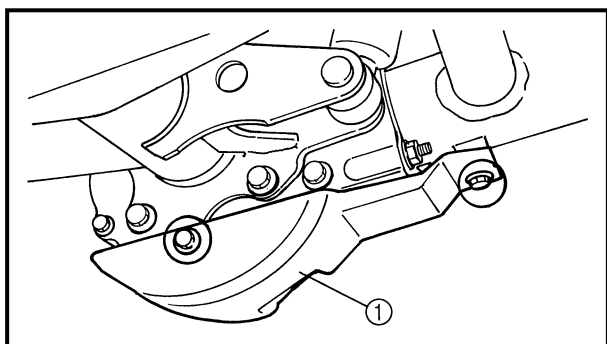
1.Remove:

- Rear wheel (left)
- Wheel hub
- Rear wheel (right)
- Brake drum
- Brake shoe plate
- Rear axle

Refer to the "REAR WHEEL/REAR BRAKE AND REAR AXLE - REMOVAL" section.

2.Remove:

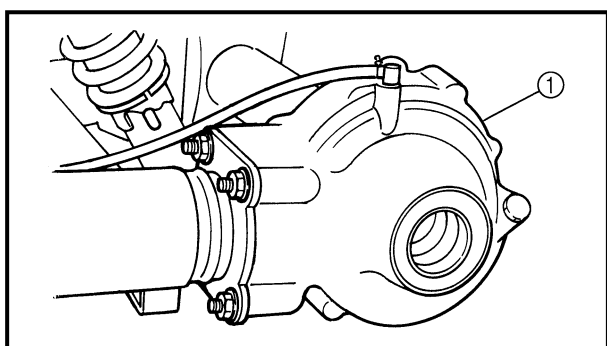
- Final gear case protector ①



3.Remove:

- Final gear case unit ①

Refer to the "FINAL DRIVE GEAR AND DRIVE SHAFT - REMOVAL" section in CHAPTER 6.

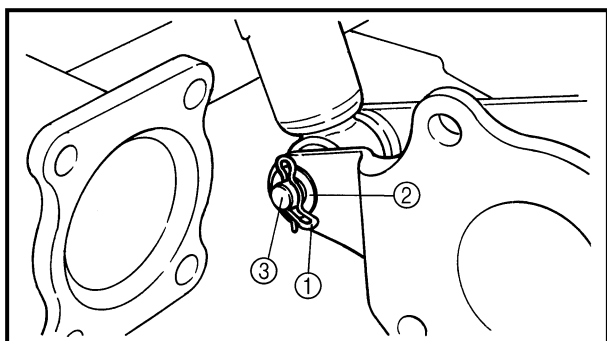


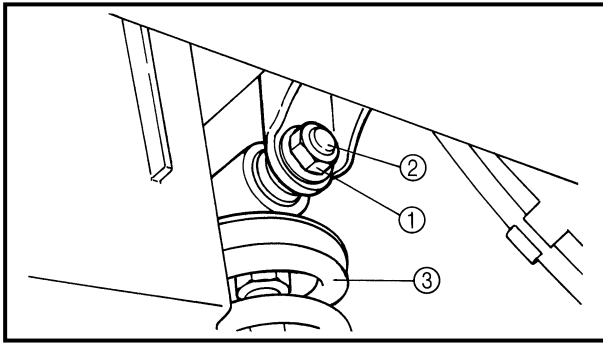
4.Remove:

- Clip ①
- Washer ②
- Shaft ③ (shock absorber - lower)
- Thrust cover

### NOTE:

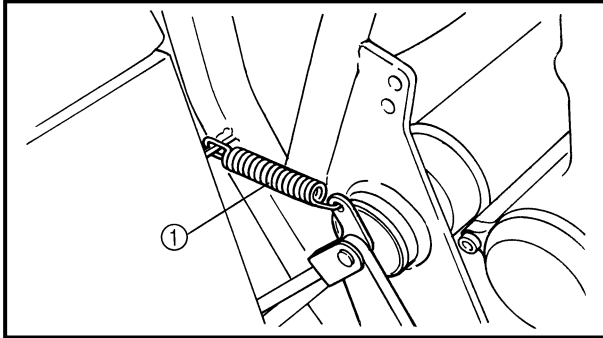
When removing the lower shaft ③, hold the swingarm so that it does not drop downwards when the shaft is removed.





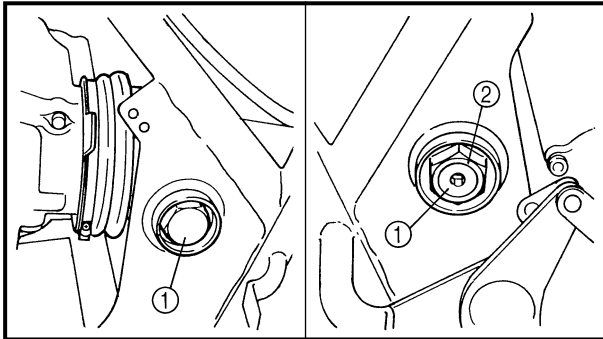
### 5.Remove:

- Nut ① (shock absorber - upper)
- Bolt ②
- Shock absorber ③



### 6.Remove:

- Spring (rear brake pedal) ①



### 7.Remove:

- Caps (pivot shaft)

### 8.Inspect:

- Swingarm free play

\*\*\*\*\*

### Free play inspection steps:

- Check the tightening torque of the pivot shafts ① and locknut ② (right side of pivot shaft).



#### Pivot shaft (left side):

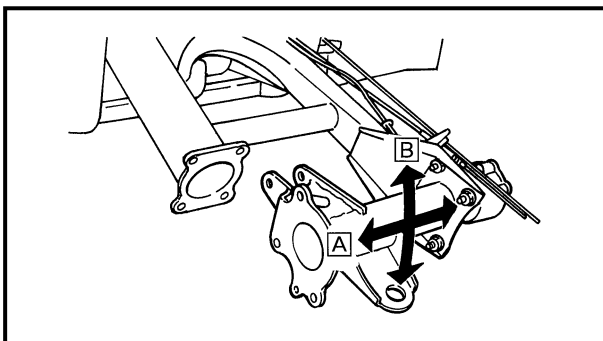
130 Nm (13.0 m • kg, 94 ft • lb)

#### Pivot shaft (right side):

6 Nm (0.6 m • kg, 4.3 ft • lb)

#### Locknut (right side of pivot shaft):

130 Nm (13.0 m • kg, 94 ft • lb)



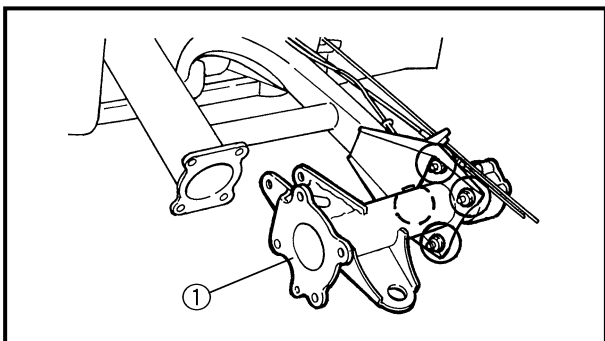
#### Free play limit:

1.0 mm (0.04 in)

- Check the swingarm vertical movement [B] by moving it up and down.

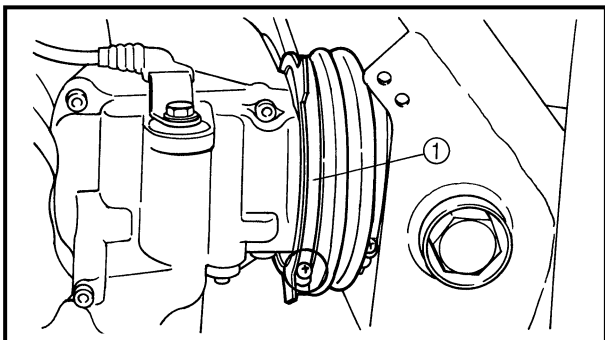
If vertical movement is tight, binding or rough, check the spacer collar, bearing and frame pivot.

\*\*\*\*\*



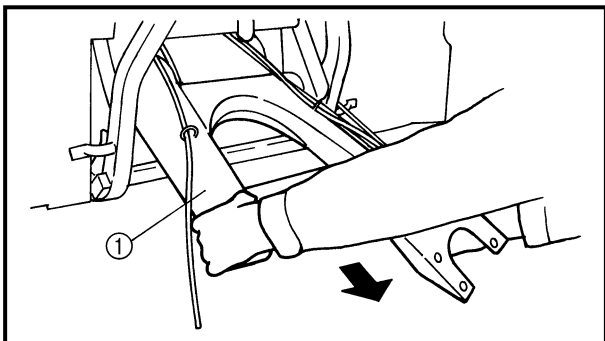
9.Remove:

- Rear axle housing ①



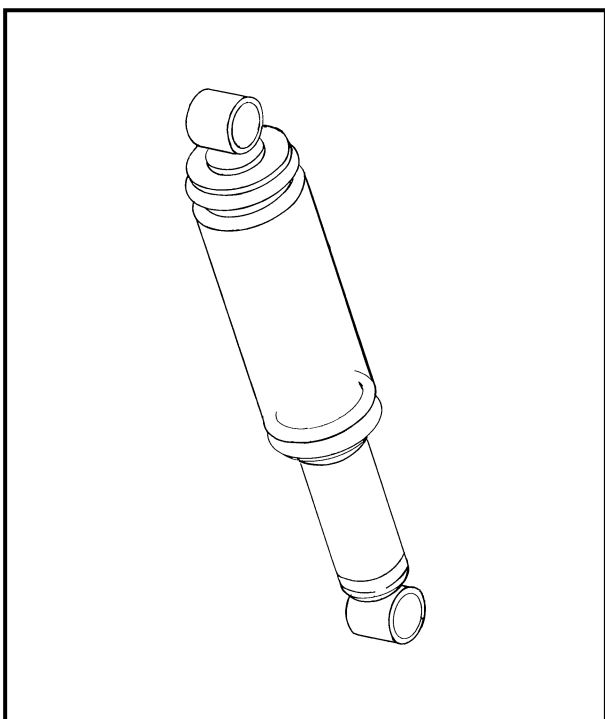
10.Remove:

- Clamp ① (rubber boot)
- Locknut (right side of pivot shaft)
- Pivot shaft (swingarm)



11.Remove:

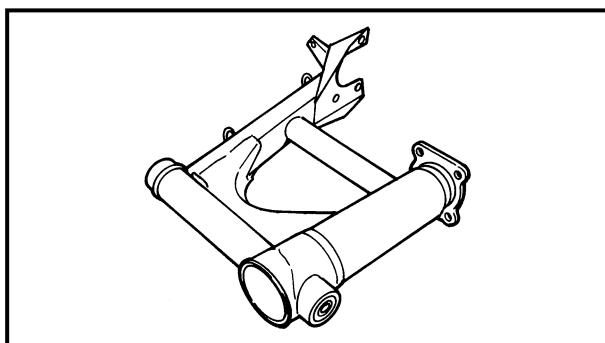
- Swingarm ①



## INSPECTION

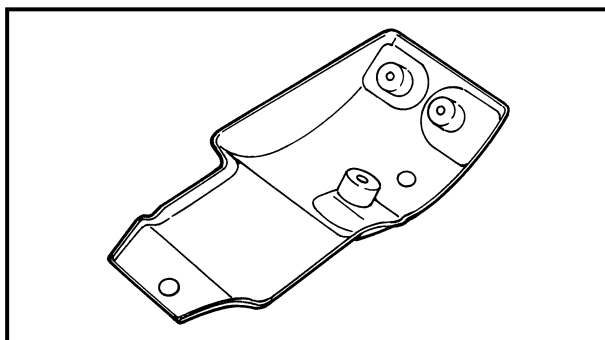
1.Inspect:

- Shock absorber  
Oil leaks → Replace the shock absorber assembly.
- Shock absorber rod  
Bends/Damage → Replace the shock absorber assembly.
- Spring  
Fatigue/Damage → Replace the shock absorber assembly.  
Move the spring up and down.



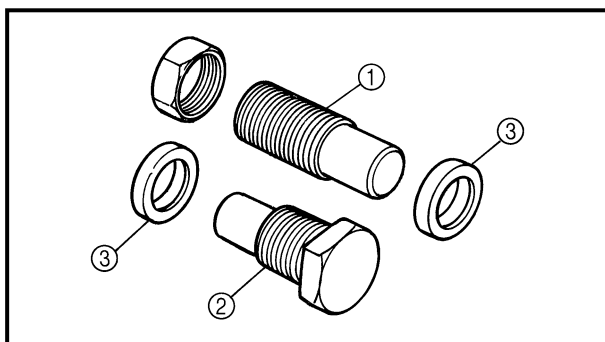
## 2.Inspect:

- Swingarm  
Cracks/Bends/Damage → Replace.
- Axle housing  
Cracks/Bends/Damage → Replace.



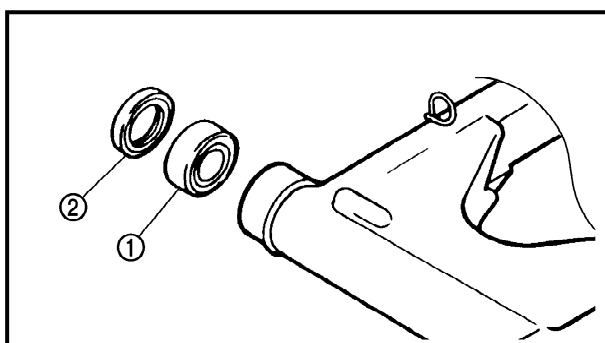
## 3.Inspect:

- Final gear case under cover  
Cracks/Bends/Damage → Replace.



## 4.Inspect:

- Pivot shaft ① (right side)
- Pivot shaft ② (left side)
- Spacer collar ③  
Wear/Damage → Replace.



## 5.Inspect:

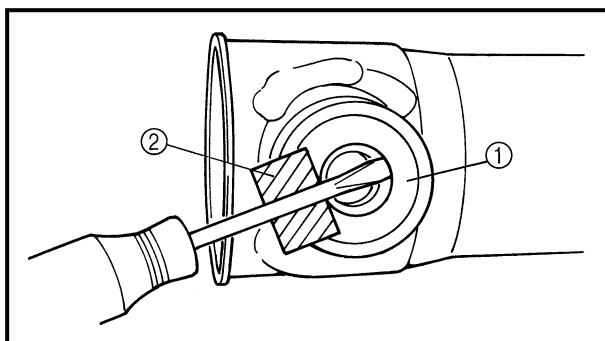
- Bearings ① (swingarm)  
Bearings allow play in the swingarm or to the bearing turns roughly → Replace.
- Oil seals ②  
Wear/Damage → Replace.

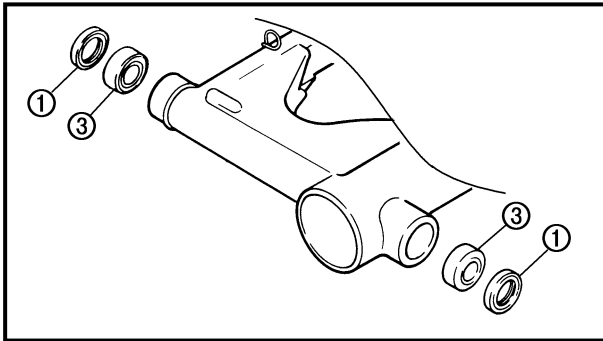
\*\*\*\*\*

## Swingarm bearing and oil seal replacement steps:

- Clean the area around the bearings on the swingarm.
- Remove the oil seals ① use a flat-head screw driver.

**NOTE:** \_\_\_\_\_  
Place a wood block ② on the outer edge to protect this edge.





- Remove the bearings ③ using a general bearing puller.
- Install the new bearings and oil seal by reversing the previous steps.

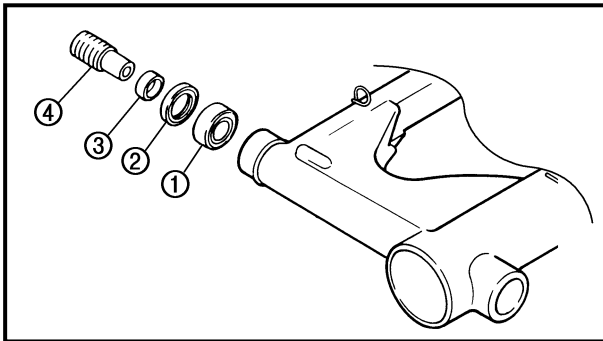
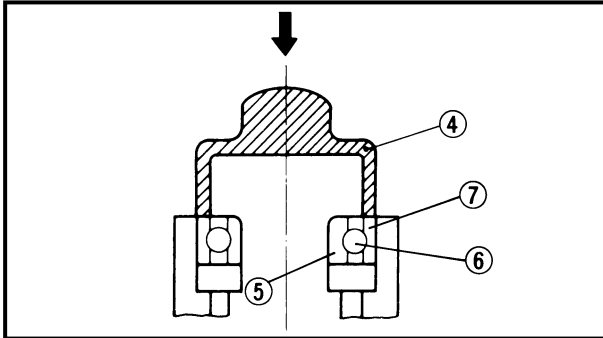
## NOTE:

Use a socket ④ that matches the outside diameter of the race of the bearing and oil seal.

## CAUTION:

Do not strike the center race ⑤ or balls ⑥ of the bearing. Contact should be made only with the outer race ⑦.

\*\*\*\*\*



## INSTALLATION

Reverse the "REMOVAL" procedures. Note the following points.

### 1.Lubricate:

- Bearings ①
- Oil seals ②
- Collars ③
- Pivot shafts ④

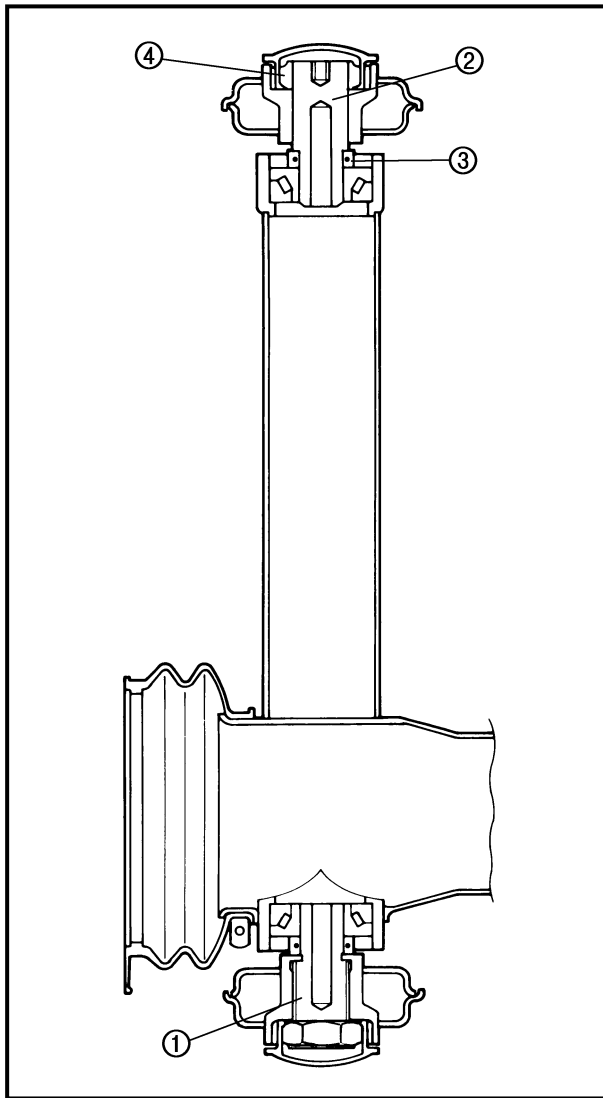


Lithium-soap base grease

### 2.Install:

- Swingarm
- Rear axle housing
- Pivot shafts (swingarm)





### 3.Tighten:

- Pivot shafts (swingarm)
- Locknut (pivot shaft)

\*\*\*\*\*

### Pivot shaft tightening steps:

- Tighten the pivot shaft ① (left) to specification.



**Pivot shaft (left):**  
130 Nm (13.0 m • kg, 94 ft • lb)

- Tighten the pivot shaft ② (right) until it contacts the collar ③.



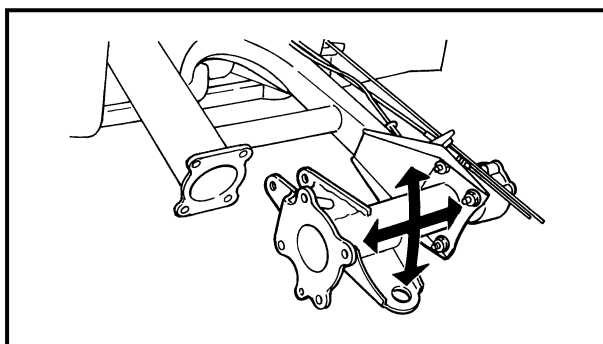
**Pivot shaft (right):**  
6 Nm (0.6 m • kg, 4.3 ft • lb)

- Tighten the locknut ④ (right) to specification.



**Locknut (right):**  
130 Nm (13.0 m • kg, 94 ft • lb)

\*\*\*\*\*



### 4.Inspect:

- Swingarm free play  
Refer to the step 8. in the “REMOVAL” section.

### 5.Lubricate:

- Bushings (shock absorber-upper and lower)



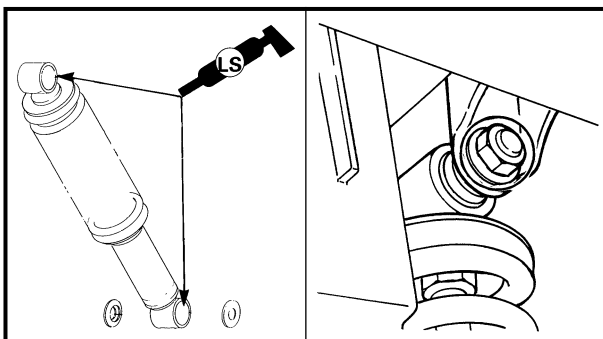
**Lithium-soap base grease**

### 6.Install:

- Shock absorber



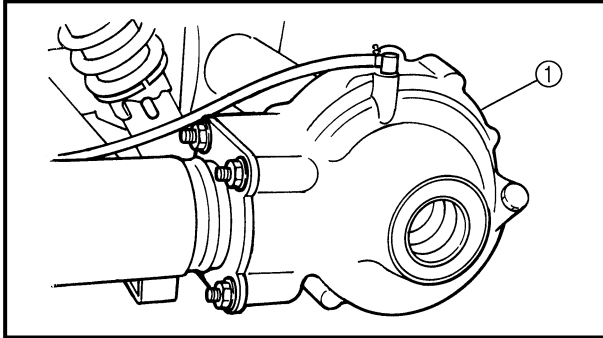
**Nut (shock absorber - upper):**  
50 Nm (5.0 m • kg, 36 ft • lb)





7.Install:

- Clip



8.Install:

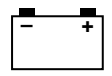
- Final gear assembly ①

Refer to the "FINAL DRIVE GEAR AND DRIVE SHAFT - ASSEMBLY - INSTALLATION" section in CHAPTER 6.

9.Install:

- Rear axle
- Brake shoe plate
- Brake drum
- Rear wheel (right)
- Wheel hub (left)
- Rear wheel (left)

Refer to the "REAR WHEEL/REAR BRAKE AND REAR AXLE - INSTALLATION" section.

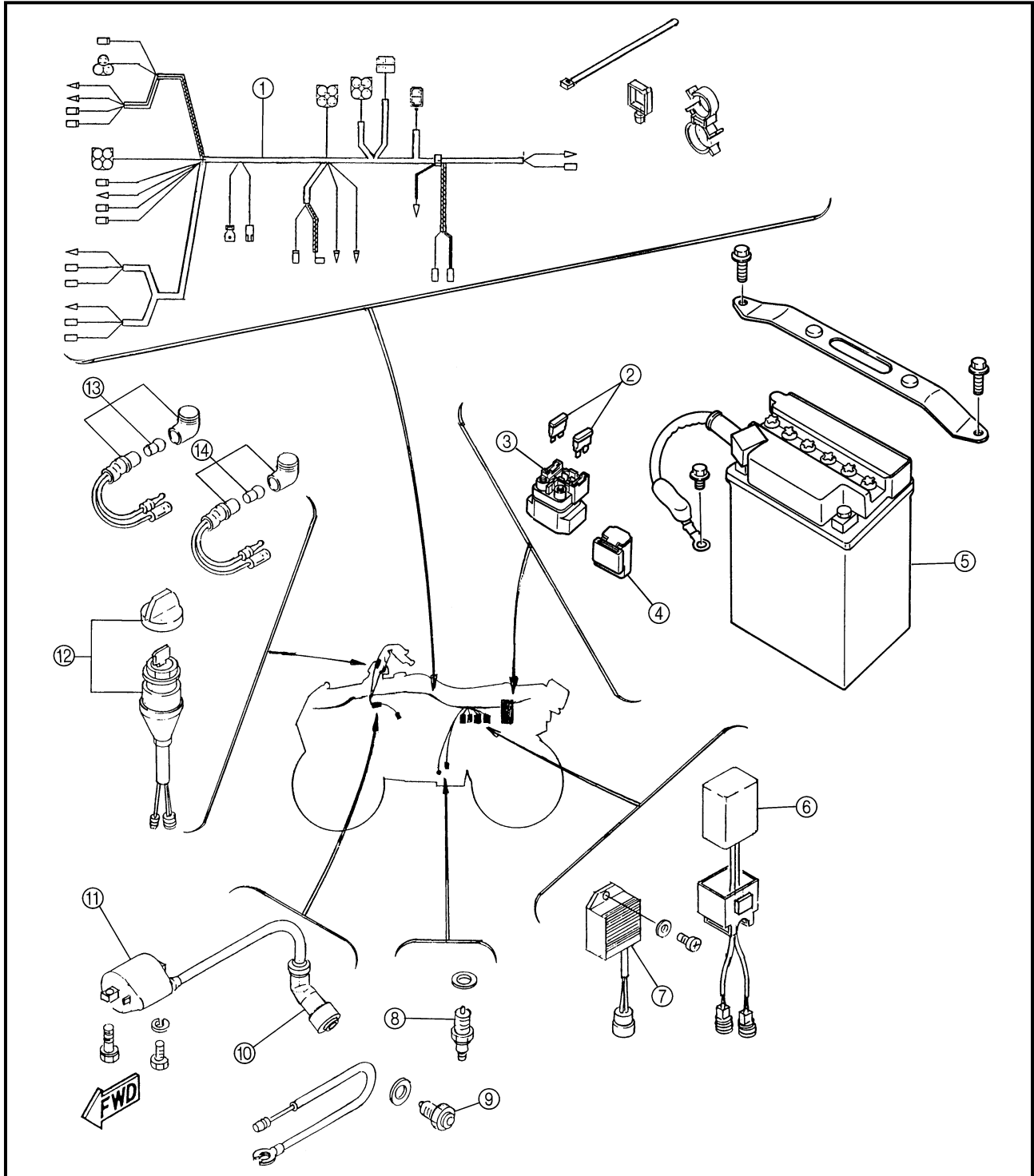


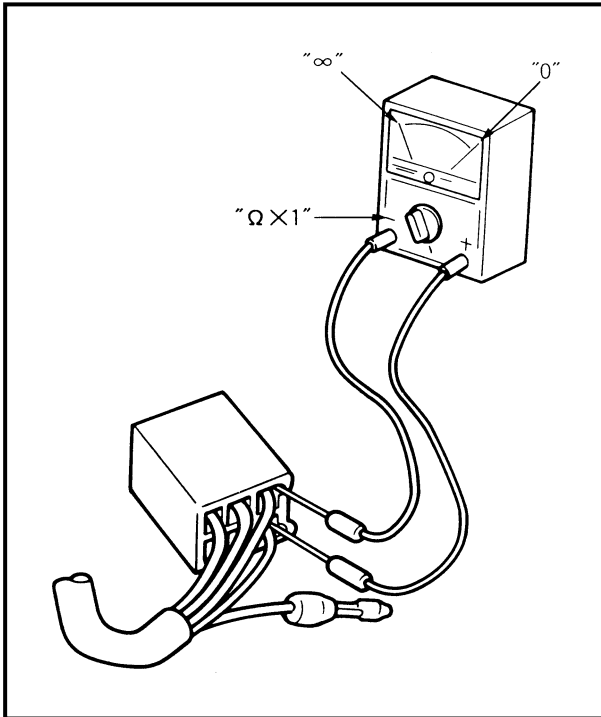
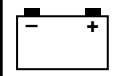
EB800000

## ELECTRICAL

## ELECTRICAL COMPONENTS

- |                                  |                           |
|----------------------------------|---------------------------|
| ① Wire harness                   | ⑧ Reverse switch          |
| ② Fuses                          | ⑨ Neutral switch          |
| ③ Starter relay                  | ⑩ Spark plug cap          |
| ④ Starting circuit cut-off relay | ⑪ Ignition coil           |
| ⑤ Battery                        | ⑫ Main switch             |
| ⑥ CDI unit                       | ⑬ Neutral indicator light |
| ⑦ Rectifier/regulator            | ⑭ Reverse indicator light |





## SWITCH INSPECTION

### SWITCH INSPECTION

Use a pocket tester to check the terminals for continuity. If the continuity is faulty at any point, replace the switch.

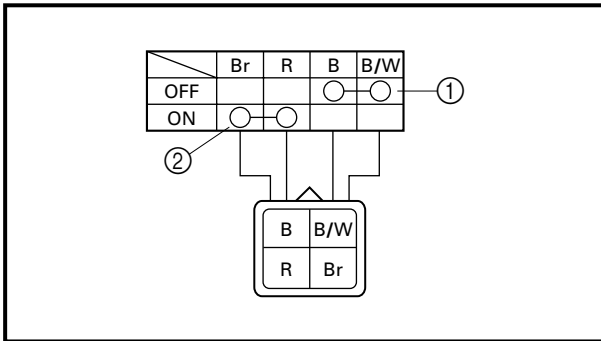


**Pocket tester:**

**P/N. YU-03112, 90890-03112**

### NOTE:

- Set the pocket tester to "0" before starting the test.
- The pocket tester should be set to the " $\Omega \times 1$ " range when testing the switch for continuity.
- Turn the switch on and off a few times when checking it.



## INSPECTING A SWITCH SHOWN IN THE MANUAL

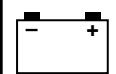
The terminal connections for switches (main switch, handlebar switch, engine stop switch, light switch, etc.) are shown in a chart similar to the one on the left.

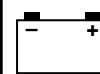
This chart shows the switch positions in the column and the switch lead colors in the top row.

For each switch position, "○—○" indicates the terminals with continuity.

### The example chart shows that:

- ① There is continuity between the "Black and Black/White" leads when the switch is set to "OFF".
- ② There is continuity between the "Red and Brown" leads when the switch is set to "ON".



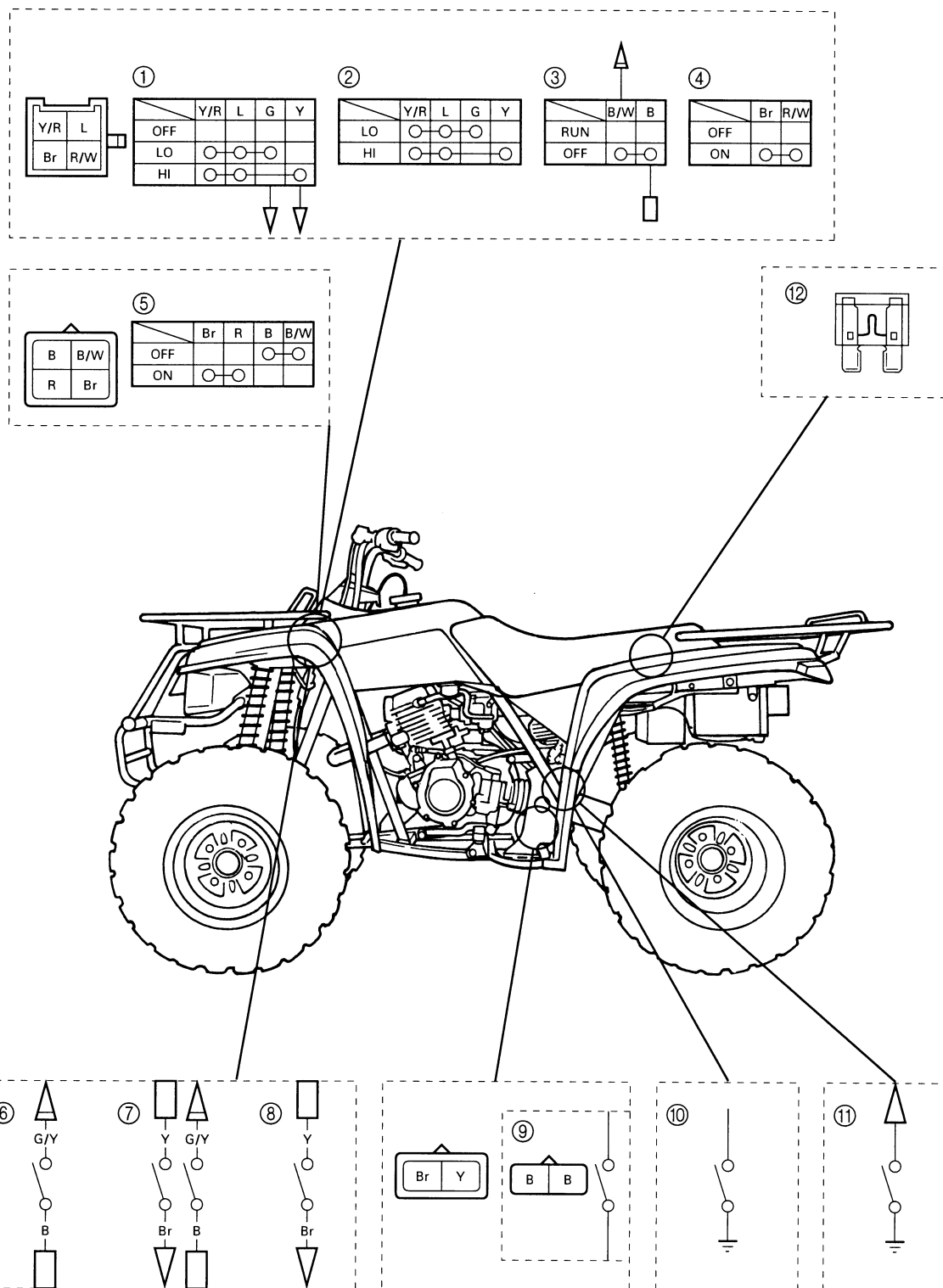


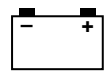
### SWITCH CONTINUITY INSPECTION

Refer to "SWITCH INSPECTION" and check for continuity between lead terminals.

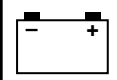
Poor connection, no continuity → Correct or replace.

✱ The coupler locations are circled.





- ① Lights switch
- ② Lights switch (for New Hampshire and Maine)
- ③ Engine stop switch
- ④ Starter switch
- ⑤ Main switch
- ⑥ Rear brake lever switch
- ⑦ Rear brake lever switch (for New Hampshire and Maine)
- ⑧ Front brake lever switch (for New Hampshire and Maine)
- ⑨ Rear brake pedal switch (for New Hampshire and Maine)
- ⑩ Reverse switch
- ⑪ Neutral switch
- ⑫ Fuse



## CHECKING OF BULBS (FOR HEADLIGHT)

### CHECKING BULBS CONDITION

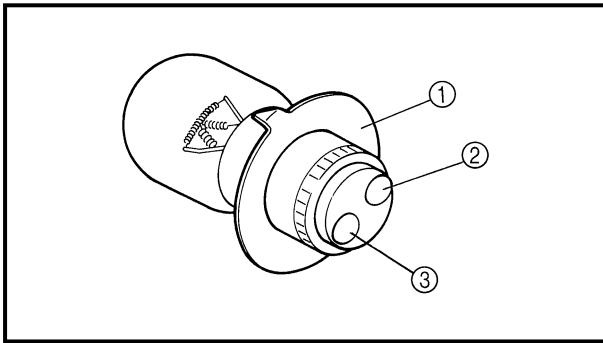
1.Remove the bulb.

#### CAUTION:

Be sure to hold the socket firmly when removing the bulb. Never pull the lead. Otherwise, the lead may be pulled off the terminal in the coupler.

#### ⚠ WARNING

Keep flammable products and your hands away from the headlight bulb while it is on. It will be hot. Do not touch the bulb until it cools down.



2.Check the bulb terminals for continuity.

\*\*\*\*\*

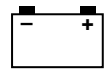
#### Checking steps:

- Set the pocket tester selector to the " $\Omega \times 1$ ".
- Connect the tester leads to the respective bulb terminals.  
First check the continuity between terminals ① and ② by connecting the tester (+) lead to terminal ① and the tester (–) lead to terminal ②. Then check the continuity between terminals ① and ③ by connecting the tester (+) lead still to terminal ① and the tester (–) lead to terminal ③. If the tester shows " $\infty$ " in either case, replace the bulb.

\*\*\*\*\*

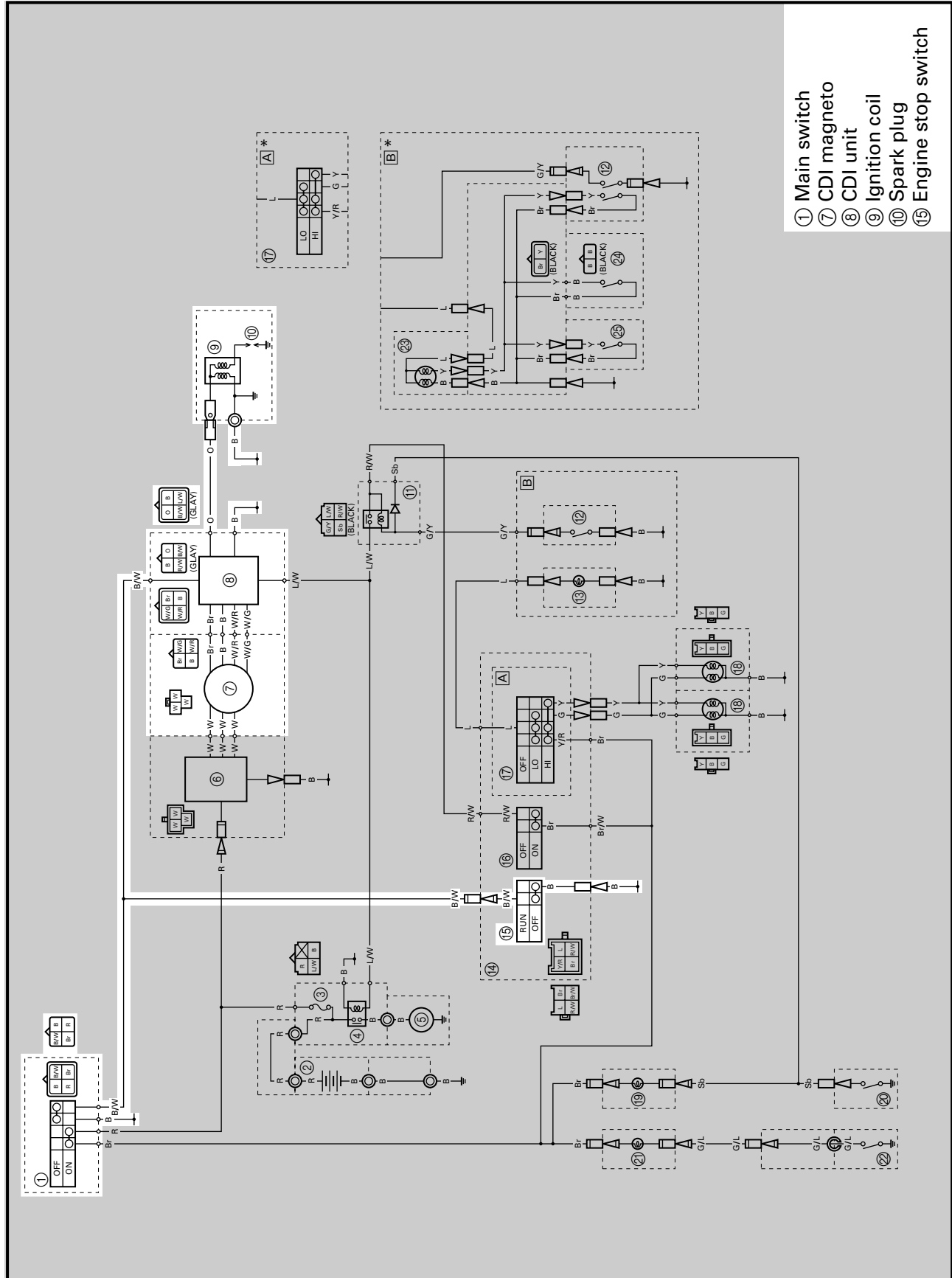
3.Check the bulb socket by installing a proven bulb to it. As in the checking of bulbs, connect the pocket tester leads to the respective leads of the socket and check for continuity in the same manner as mentioned above.

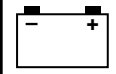




EB802000

# IGNITION SYSTEM CIRCUIT DIAGRAM





EB802010

### TROUBLESHOOTING

#### IF THE IGNITION SYSTEM FAILS TO OPERATE (NO SPARK OR INTERMITTENT SPARK):

##### Procedure

Check:

1. Spark plugs
2. Ignition spark gap
3. Spark plug cap resistance
4. Ignition coil resistance
5. Engine stop switch
6. Main switch
7. Pickup coil resistance
8. Source coil resistance
9. Wiring connection  
(the entire ignition system)

##### NOTE:

- Remove the following part(s) before troubleshooting:
  - 1) Seat
  - 2) Front carrier
  - 3) Front fender
- Use the following special tool(s) for troubleshooting.



**Dynamic spark tester:**

**P/N. YM-34487**

**Ignition checker:**

**P/N. 90890-06754**

**Pocket tester:**

**P/N. YU-03112, 90890-03112**

##### 1. Spark plug

- Check the spark plug condition.
- Check the spark plug type.
- Check the spark plug gap.  
Refer to "SPARK PLUG INSPECTION" in CHAPTER 3.

**Standard spark plug:**  
**DR7EA**



**Spark plug gap:**  
**0.6 ~ 0.7 mm (0.024 ~ 0.028 in)**

INCORRECT



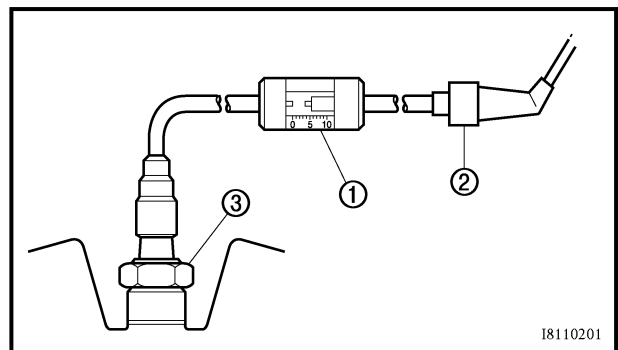
CORRECT

Repair or replace the spark plug.

for USA/CDN

##### 2. Ignition spark gap

- Disconnect the spark plug cap from the spark plug.
- Connect the dynamic spark tester ① as shown.
- ② Spark plug cap
- ③ Spark plug
- Turn the main switch to "ON".
- Check the ignition spark gap.
- Crank the engine by pushing the starter switch, and increase the spark gap until a misfiring occurs.

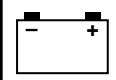


MEETS SPECIFICATION



**Minimum spark gap:**  
**6.0 mm (0.24 in)**

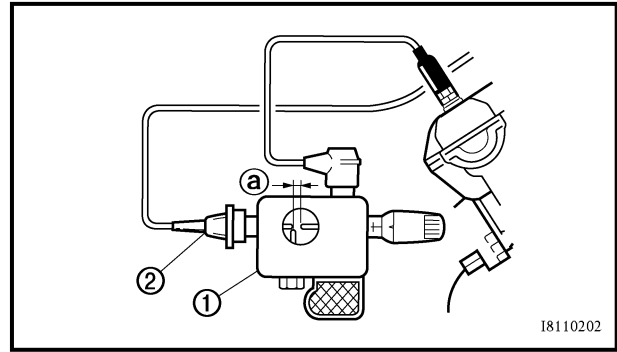
The ignition system is not faulty.



for EUR/AUS

### 2. Ignition spark gap

- Disconnect the spark plug cap from the spark plug.
- Connect the ignition checker ① as shown.
- ② Spark plug cap
- Turn the main switch to "ON".
- Check the ignition spark gap ③.
- Crank the engine by pushing the starter switch and increase the spark gap until a misfire occurs.



I8110202



**Minimum spark gap:**  
**6.0 mm (0.24 in)**

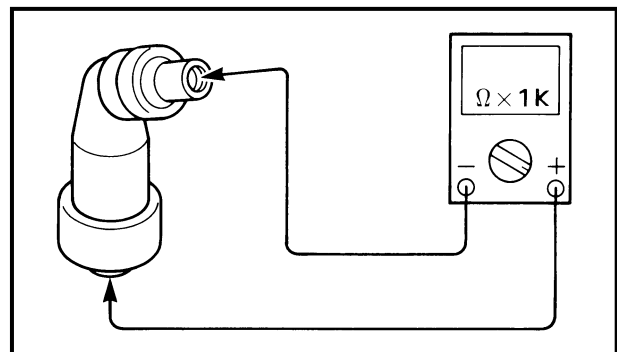
OUT OF SPECIFICATION  
OR NO SPARK

MEETS SPECIFICATION

The ignition system is not faulty.

### 3. Spark plug cap resistance

- Remove the spark plug cap.
- Connect the pocket tester ( $\Omega \times 1k$ ) to the spark plug cap.



OUT OF SPECIFICATION

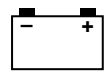
Replace the spark plug cap.

- Check that the spark plug cap has the specified resistance.



**Spark plug cap resistance:**  
**10 k $\Omega$  at 20 °C (68 °F)**

MEETS SPECIFICATION  
\*



### 4. Ignition coil resistance

- Disconnect the ignition coil connector from the wire harness.
- Connect the pocket tester ( $\Omega \times 1$ ) to the ignition coil.

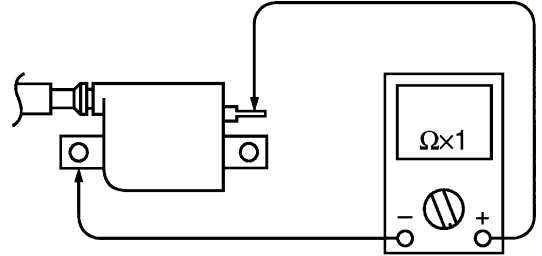
- Check that the primary coil has the specified resistance.



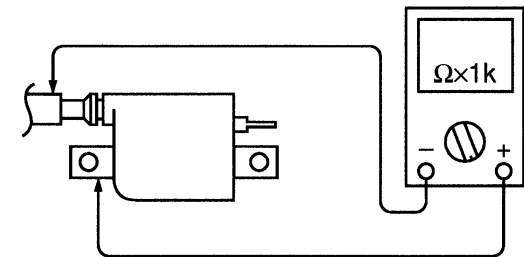
**Primary coil resistance:**  
**0.18 ~ 0.28  $\Omega$  at 20 °C (68°F)**

- Connect the pocket tester ( $\Omega \times 1k$ ) to the ignition coil.

**Tester (+) lead → Orange lead terminal**  
**Tester (-) lead → Ignition coil base**



**Tester (+) lead → Ignition coil base**  
**Tester (-) lead → Spark plug lead**



- Check that the secondary coil has the specified resistance.



**Secondary coil resistance:**  
**6.3 ~ 9.5 k $\Omega$  at 20 °C (68°F)**



**BOTH MEET  
SPECIFICATION**

**OUT OF SPECIFICATION**

**Replace the ignition coil.**

### 5. Engine stop switch

Refer to "SWITCH INSPECTION".



**CORRECT**

**INCORRECT**

**Replace the handlebar switch (left).**

### 6. Main switch

Refer to "SWITCH INSPECTION".

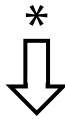
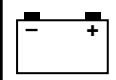


**CORRECT**

**INCORRECT**

**Replace the main switch.**

\*

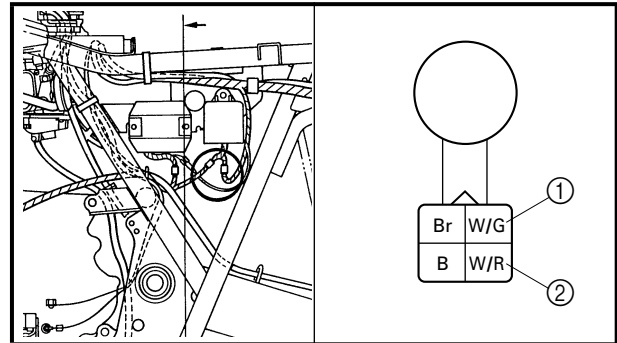


### 7. Pickup coil resistance

- Disconnect the CDI magneto coupler from the wire harness.
- Connect the pocket tester ( $\Omega \times 100$ ) to the pickup coil terminal.

**Tester (+) lead → White/Green terminal ①**

**Tester (-) lead → White/Red terminal ②**



- Check the pickup coil for the specified resistance.



**Pickup coil resistance:**  
**189~ 231  $\Omega$  at 20°C (68°F)**  
**(White/Green – White/Red)**

**OUT OF SPECIFICATION**

**Replace the pickup coil.**



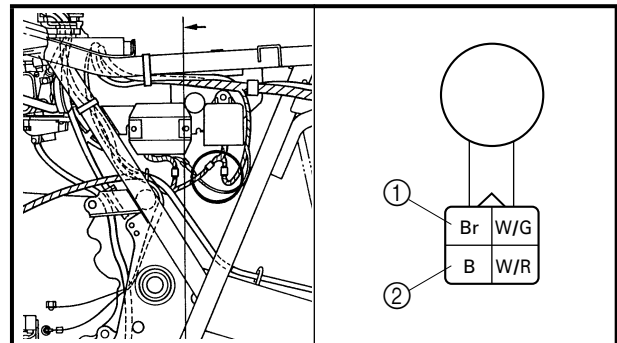
**MEETS SPECIFICATION**

### 8. Source coil resistance

- Disconnect the source coil coupler from the wire harness.
- Connect the pocket tester ( $\Omega \times 100$ ) to the source coil terminal.

**Tester (+) lead → Brown terminal ①**

**Tester (-) lead → Black terminal ②**



- Check the source coil for the specified resistance.



**Source coil resistance:**  
**270 ~ 330  $\Omega$  at 20°C (68°F)**  
**(Brown – Black)**

**OUT OF SPECIFICATION**

**Replace the source coil.**



**MEETS SPECIFICATION**

### 9. Wiring connection

- Check the connections of the entire ignition system.  
Refer to "CIRCUIT DIAGRAM".

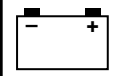
**POOR CONNECTION**

**Properly connect the ignition system.**



**CORRECT**

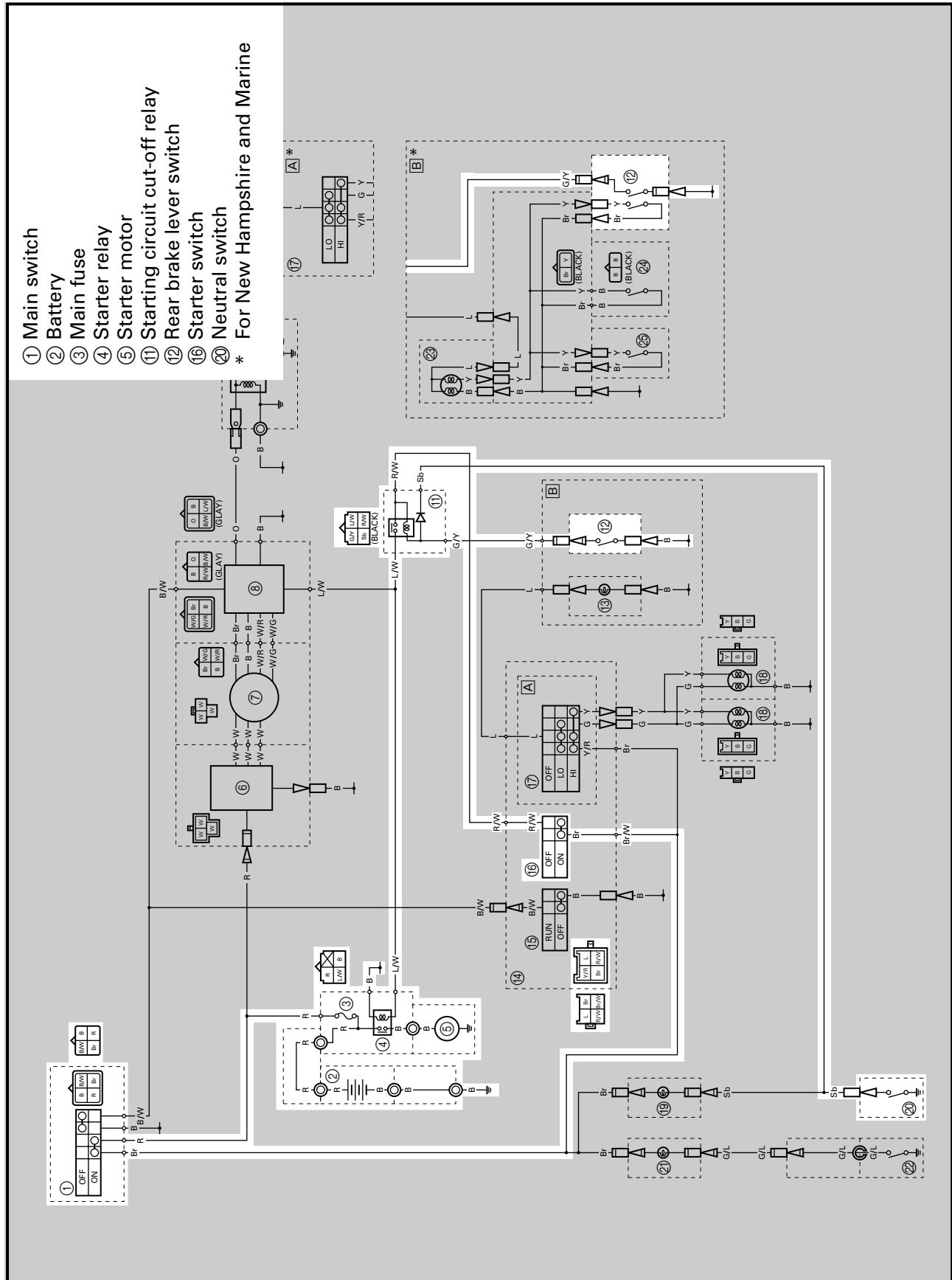
**Replace the CDI unit.**

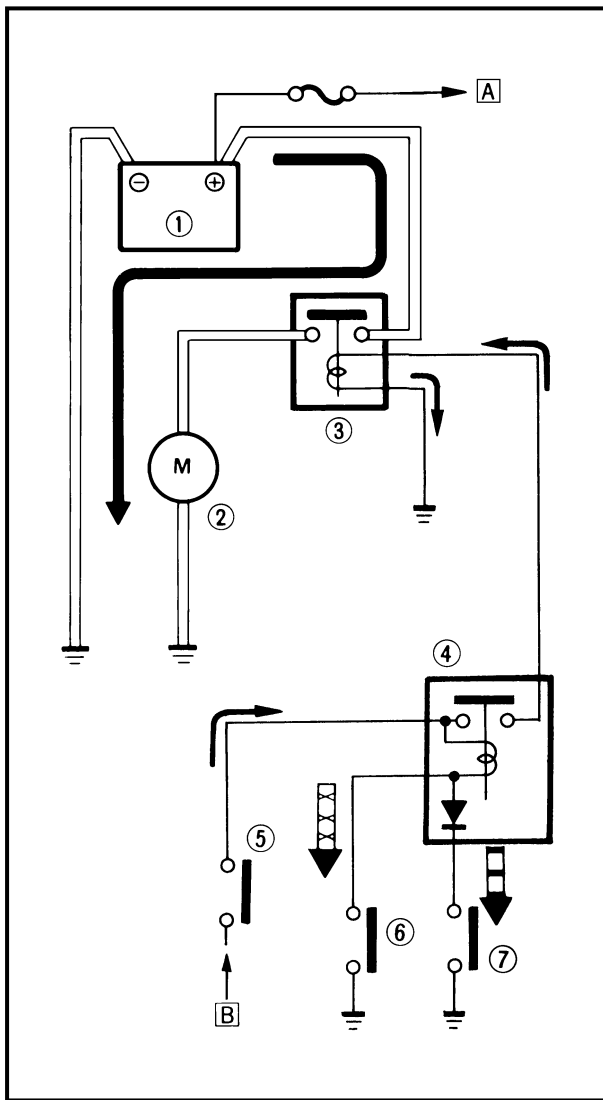
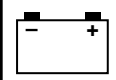


EB803000

# ELECTRIC STARTING SYSTEM CIRCUIT DIAGRAM

- ① Main switch
- ② Battery
- ③ Main fuse
- ④ Starter relay
- ⑤ Starter motor
- ⑪ Starting circuit cut-off relay
- ⑫ Rear brake lever switch
- ⑬ Starter switch
- ⑭ Neutral switch
- \* For New Hampshire and Marine





### STARTING CIRCUIT OPERATION

The starting circuit on this model consists of the starter motor, starter relay, starting circuit cut-off relay, rear brake lever switch, and neutral switch. If the main switch is on position, the starter motor can be operated only if:

- The transmission is in neutral (the neutral switch is closed).
- or**
- You pull in the rear brake lever (the rear brake lever switch is ON).

The starting circuit cut-off relay prevents the starter from operating when the select lever is in gear or in reverse and the rear brake lever is free. In this instance, the starting circuit cut-off relay is off so that current cannot reach the starter motor.

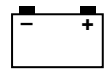


WHEN THE TRANSMISSION IS IN NEUTRAL



WHEN THE BRAKE LEVER IS PULLED IN

- ① Battery
- ② Starter motor
- ③ Starter relay
- ④ Starting circuit cut-off relay
- ⑤ Start switch
- ⑥ Rear brake lever switch
- ⑦ Neutral switch
- [A] TO MAIN SWITCH
- [B] FROM MAIN SWITCH



EB803020

## TROUBLESHOOTING

## IF THE STARTER MOTOR FAILS TO OPERATE:

**Procedure**

Check:

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1.Fuse (main)</li> <li>2.Battery</li> <li>3.Starter motor</li> <li>4.Starting circuit cut-off relay</li> <li>5.Starter relay</li> <li>6.Main switch</li> </ol> | <ol style="list-style-type: none"> <li>7.Neutral switch</li> <li>8.Rear brake lever switch</li> <li>9.Start switch</li> <li>10.Wiring connection<br/>(the entire starting system)</li> </ol> |
|---|--|

**NOTE:**

- Remove the following part(s) before troubleshooting:
  - 1)Seat
  - 2)Front carrier
  - 3)Front fender
- Use the following special tool(s) for troubleshooting.

**Pocket tester:****P/N. YU-03112, 90890-03112**

EB802011

1.Fuse (main)

Refer to "SWITCH INSPECTION".



CONTINUITY

NO CONTINUITY

Replace the fuse.

EB802012

2.Battery

- Check the battery condition.  
Refer to "BATTERY INSPECTION" in CHAPTER 3.

**Open-circuit voltage:**  
12.8 V or more at 20 °C (68 °F)

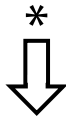
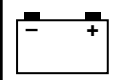


CORRECT

INCORRECT

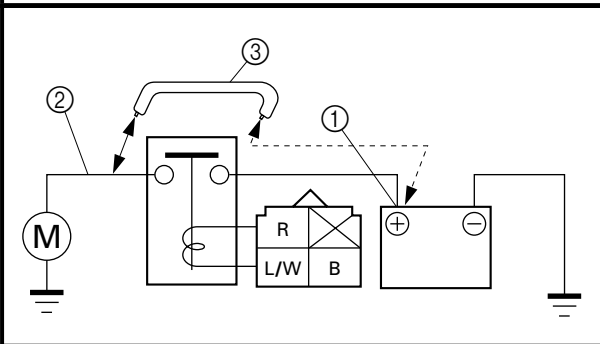
- Clean the battery terminals.
- Recharge or replace the battery.





### 3. Starter motor

- Connect the battery positive terminal ① and starter motor cable ② using a jumper lead ③ \*.
- Check the operation of the starter motor.



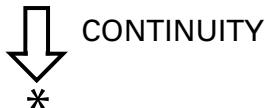
### 4. Starting circuit cut-off relay

- Remove the starting circuit cut-off relay from the wire harness.
- Connect the pocket tester ( $\Omega \times 1$ ) and the battery (12V) to the starting circuit cut-off relay terminals.

**Battery (+) terminal** → **Red/White terminal** ①  
**Battery (-) terminal** → **Green/Yellow terminal** ②

**Tester (+) lead** → **Red/White terminal** ①  
**Tester (-) lead** → **Blue/White terminal** ③

- Check the starting circuit cut-off relay for continuity.



\*

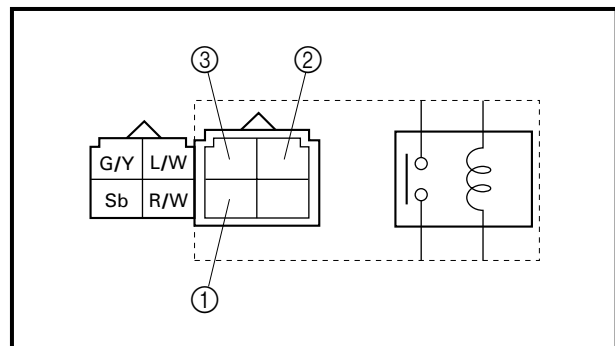
### ⚠ WARNING

- A wire that is used as a jumper lead must have the equivalent capacity or more as that of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity.

DOES NOT TURN



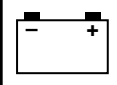
Repair or replace the starter motor.



NO CONTINUITY

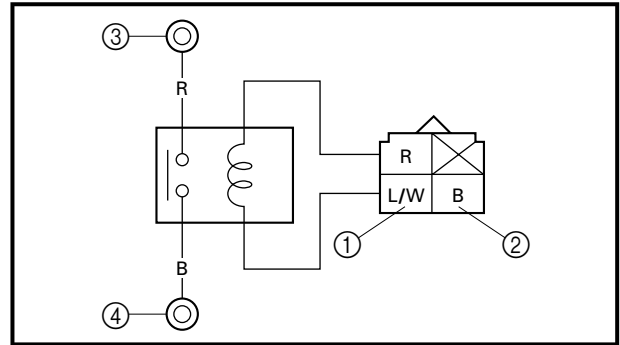


Replace the starting circuit cut-off relay.



## 5. Starter relay

- Remove the starter relay from the wire harness.
- Connect the pocket tester ( $\Omega \times 1$ ) and the battery (12 V) to the starter relay terminals.



**Battery (+) terminal** → **Blue/White terminal** ①  
**Battery (-) terminal** → **Black terminal** ②

**Tester (+) lead** → **Red terminal** ③  
**Tester (-) lead** → **Black terminal** ④

- Check the starter relay for continuity.

NO CONTINUITY

Replace the starter relay.



CONTINUITY

## 6. Main switch

Refer to "SWITCH INSPECTION".

INCORRECT

Replace the main switch.



CORRECT

## 7. Neutral switch

Refer to "SWITCH INSPECTION".

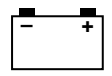
INCORRECT

Replace the neutral switch.



CORRECT

\*

**8.Rear brake lever switch**

Refer to "SWITCH INSPECTION".

INCORRECT



CORRECT

Replace the rear brake lever switch.

**9.Start switch**

Refer to "SWITCH INSPECTION".

INCORRECT



CORRECT

Replace the handlebar switch (left).

EB803028

**10.Wiring connection**

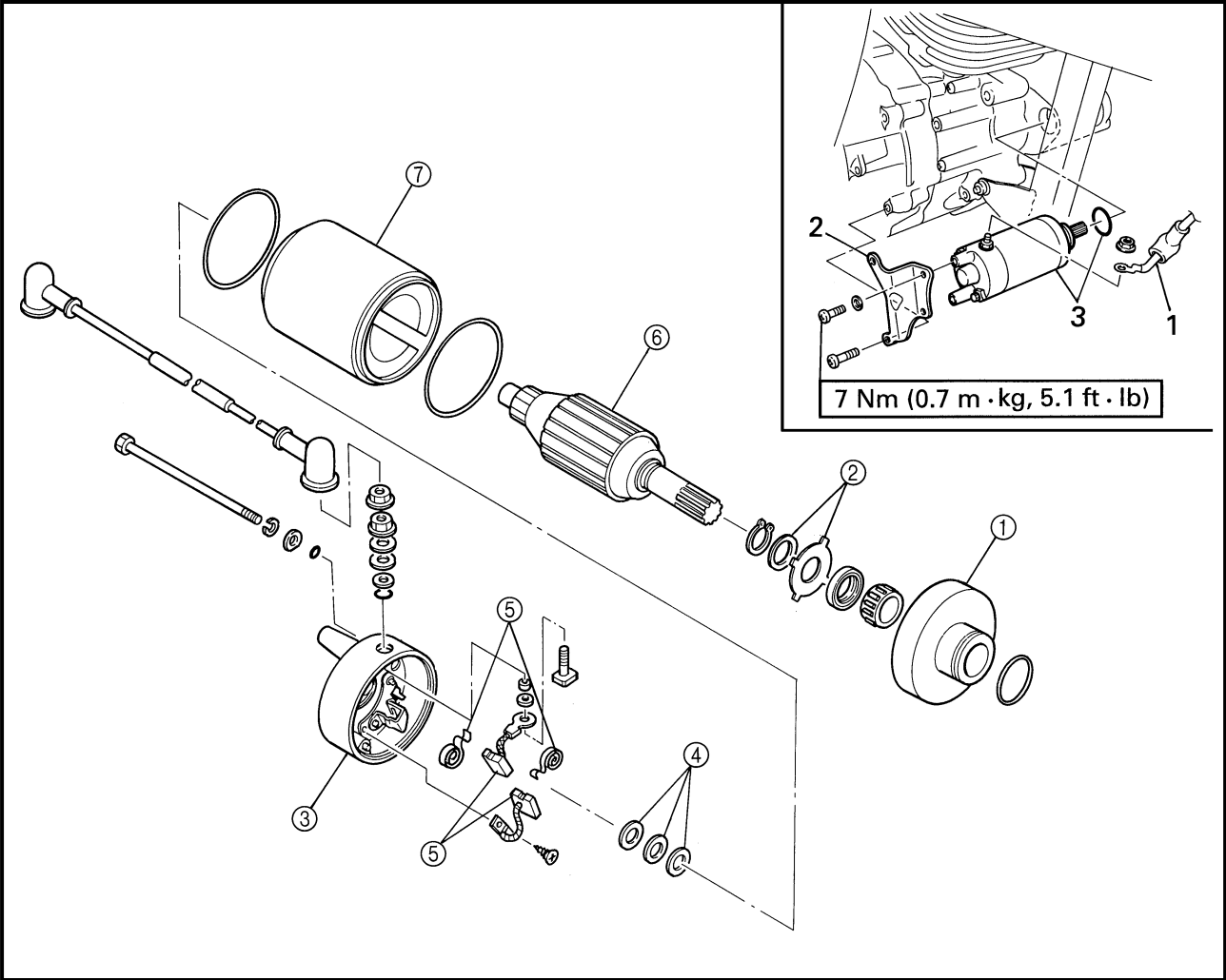
- Check the connections of the entire starting system.  
Refer to "CIRCUIT DIAGRAM".

POOR CONNECTION

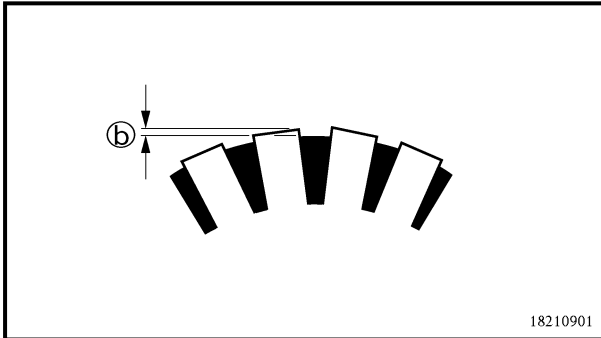
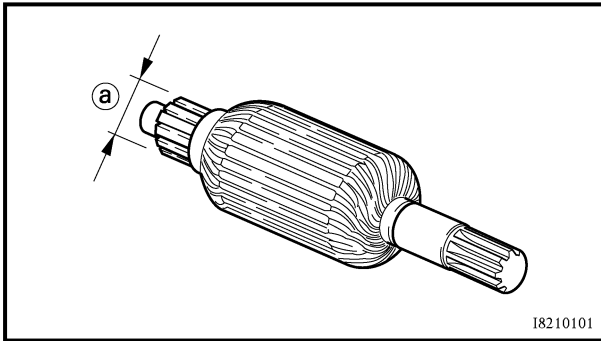
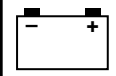
Properly connect the starting system.



STARTER MOTOR



Order	Job name/Part name	Q'ty	Remarks
	<b>Starter motor removal</b>		Remove the parts in the order below.
1	Starter motor lead	1	
2	Starter motor bracket	1	
3	Starter motor / O-ring	1/1	
	<b>Starter motor disassembly</b>		Disassemble the parts in the order below.
①	Bracket 1	1	
②	Washer/shim	1/1	
③	Bracket 2	1	
④	Shims		Refer to "STARTER MOTOR ASSEMBLY".
⑤	Brush/brush spring	2/2	
⑥	Armature coil	1	
⑦	Yoke	1	
			For assembly, reverse the disassembly procedure.

**STARTER MOTOR INSPECTION****1. Inspect:**

- Commutator  
Dirty → Clean it with #600 grit sandpaper.

**2. Measure:**

- Commutator diameter ①  
Out of specification → Replace the starter motor.



**Outside diameter:**  
28 mm (1.10 in)  
**<Wear limit:>**  
27 mm (1.06 in)

**3. Measure:**

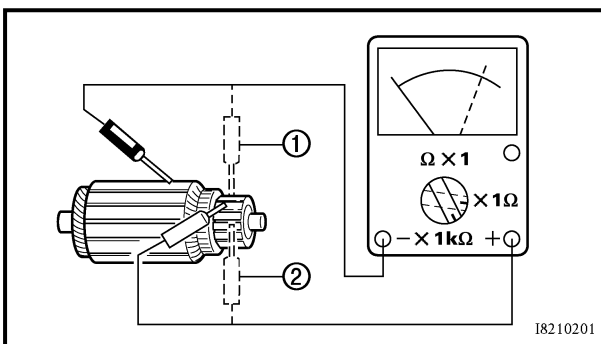
- Mica undercut ②  
Out of specification → Scrape the mica using a hacksaw blade.



**Mica undercut:**  
0.7 mm (0.028 in)

**NOTE:**

Scrape the mica to the proper measurement using a hacksaw blade which has been grounded to fit the commutator.

**4. Inspect:**

- Armature coil (insulation/continuity)  
Defects → Replace the starter motor.

\*\*\*\*\*

**Armature coil inspection steps:**

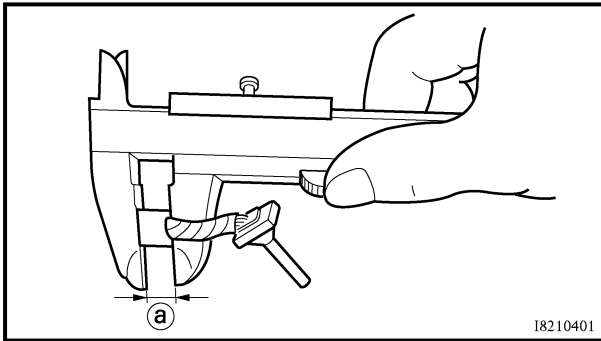
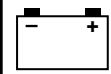
- Connect the pocket tester for the continuity check ① and insulation check ②.
- Measure the armature resistances.



**Armature coil resistance:**  
**Continuity check ①:**  
0.004 ~ 0.005 Ω at 20 °C (68 °F)  
**Insulation check ②:**  
More than 1 MΩ at 20 °C (68 °F)

- If the resistance is incorrect, replace the starter motor.

\*\*\*\*\*



## 5.Measure:

- Brush length ① (each)

Out of specification → Replace the brush.



**Brush length:**

**10 mm (0.39 in)**

**<Wear limit:>**

**3.5 mm (0.14 in)**

## 6.Measure:

- Brush spring force

Fatigue/out of specification → Replace as a set.



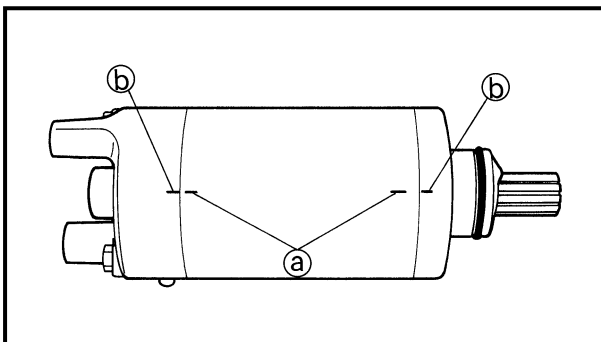
**Brush spring force:**

**730 ~ 970 g (7.16 ~ 9.52 N)**

## 7.Inspect:

- Oil seal
- Bushing
- O-rings

Wear/damage → Replace.

**STARTER MOTOR ASSEMBLY**

## 1.Install:

- Yoke
- Brackets

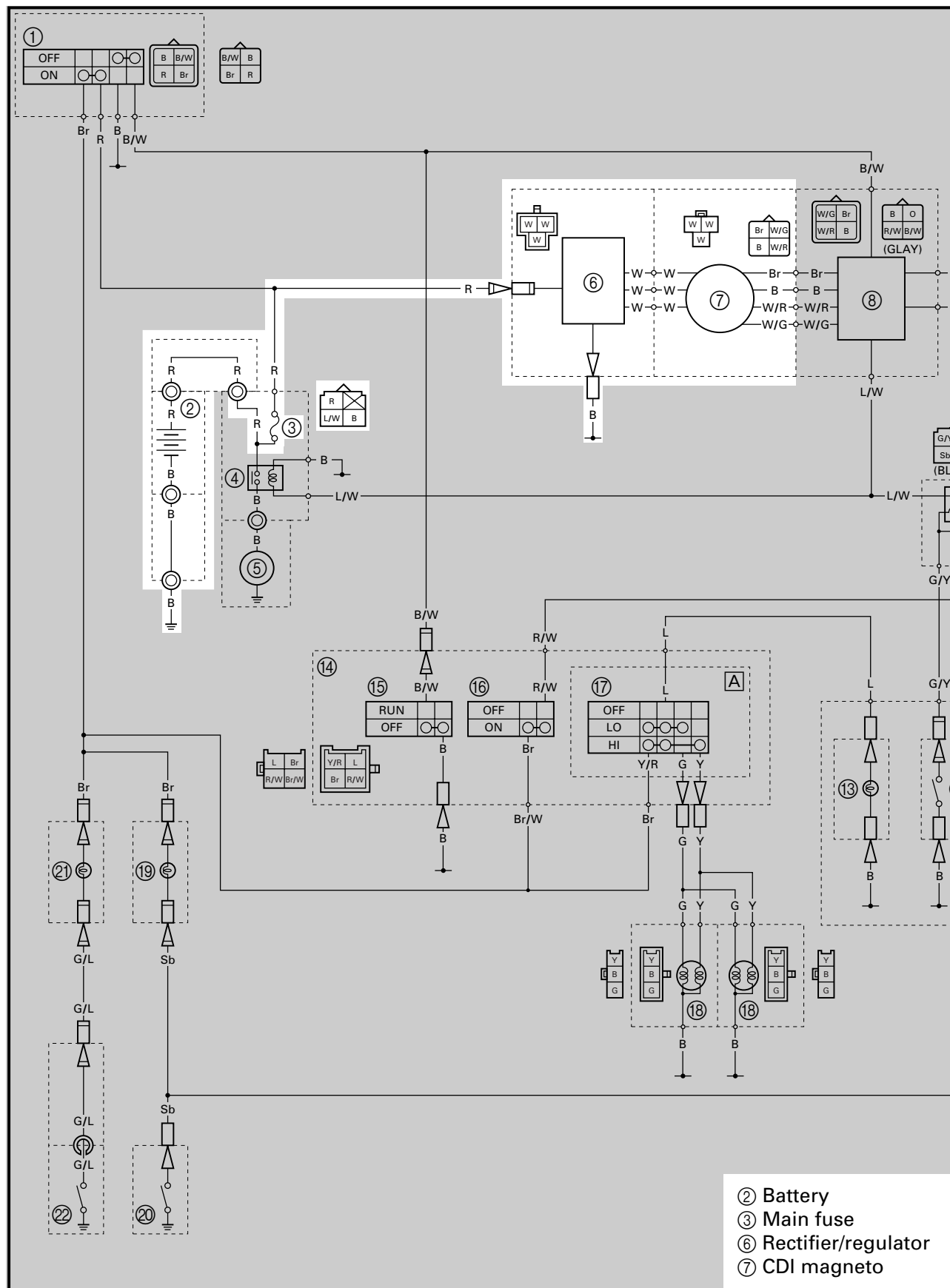
**NOTE:**

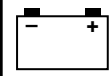
Align the match marks ① on the yoke with the match marks ② on the brackets.

EB804000

# CHARGING SYSTEM

### CIRCUIT DIAGRAM





EB804010

## TROUBLESHOOTING

## IF THE BATTERY IS NOT CHARGED:

**Procedure**

Check:

- 1.Fuse (main)
- 2.Battery
- 3.Charging voltage
- 4.Stator coil resistance
- 5.Wiring connections  
(the entire charging system)

**NOTE:**

- Remove the following part(s) before troubleshooting:
  - 1)Seat
- Use the following special tool(s) for troubleshooting.

**Inductive tachometer:****P/N. YU-8036-A****Engine tachometer:****P/N. 90890-03113****Pocket tester:****P/N. YU-03112, 90890-03112**

EB802011

1.Fuse (main)

Refer to "SWITCH INSPECTION".



CONTINUITY

NO CONTINUITY

Replace the fuse.

EB802012

2.Battery

- Check the battery condition.  
Refer to "BATTERY INSPECTION" in CHAPTER 3.

**Open-circuit voltage:**  
**12.8 V or more at 20 °C (68 °F)**



CORRECT

INCORRECT

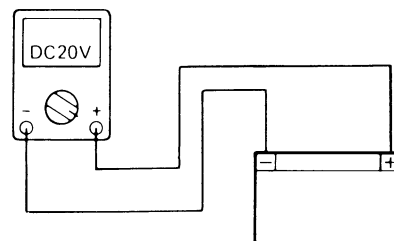
- Clean the battery terminals.
- Recharge or replace the battery.

EB804011

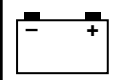
3.Charging voltage

- Connect the engine tachometer to the spark plug lead.
- Connect the pocket tester (DC 20V) to the battery.

**Tester (+) lead → Battery (+) terminal**  
**Tester (-) lead → Battery (-) terminal**







- Start the engine and accelerate to about 2,000 r/min.



**Charging voltage:**  
14 to 15 V at 2,000 r/min

**NOTE:** \_\_\_\_\_  
Use a fully charged battery.

MEETS SPECIFICATION

The charging circuit is not faulty.

OUT OF SPECIFICATION

EB804012

#### 4. Stator coil resistance

- Disconnect the AC magneto coupler from the wire harness.
- Connect the pocket tester ( $\Omega \times 1$ ) to the stator coils.

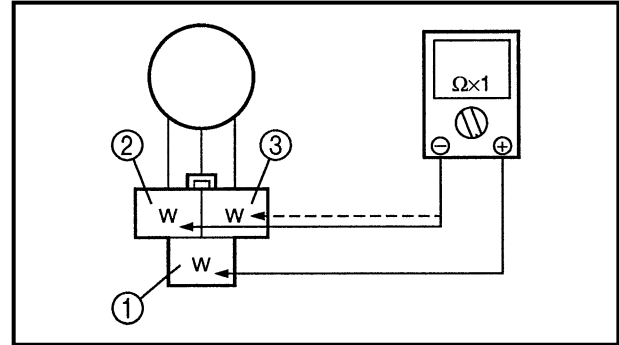
**Tester (+) lead** → **White terminal** ①  
**Tester (-) lead** → **White terminal** ②

**Tester (+) lead** → **White terminal** ①  
**Tester (-) lead** → **White terminal** ③

- Measure the stator coil resistance.



**Stator coil resistance:**  
0.45 ~ 0.55  $\Omega$  at 20 °C (68 °F)



OUT OF SPECIFICATION

Replace the stator coil assembly.

MEETS SPECIFICATION

EB804015

#### 5. Wiring connections

- Check the connections of the entire charging system. Refer to "CIRCUIT DIAGRAM".

POOR CONNECTION

Properly connect the charging system.

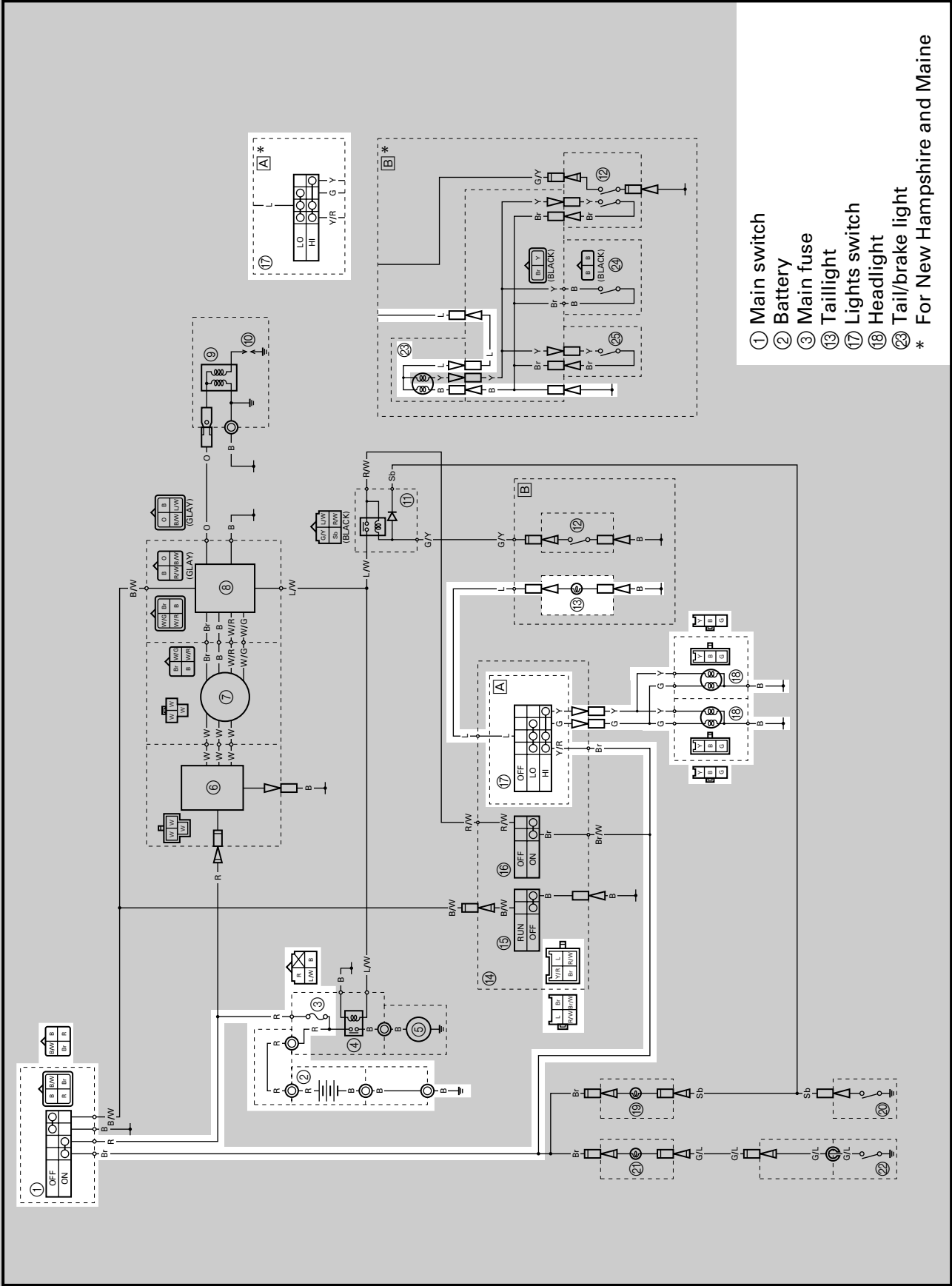
CORRECT

Replace the rectifier/regulator.

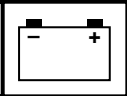


EB805000

LIGHTING SYSTEM  
CIRCUIT DIAGRAM



- ① Main switch
- ② Battery
- ③ Main fuse
- ⑬ Taillight
- ⑰ Lights switch
- ⑱ Headlight
- ⑲ Tail/brake light
- \* For New Hampshire and Maine



EB805010  
TROUBLESHOOTING

IF THE HEADLIGHT AND/OR TAILLIGHT FAIL TO COME ON:

Procedure

Check:

- 1.Fuse (main)

2.Battery

3.Main switch
- 4.Lights switch

5.Wiring connections  
(the entire lighting system)

NOTE:

- Remove the following part(s) before troubleshooting:

1)Seat

2)Front carrier

3)Front fender
- Use the following special tool(s) for troubleshooting.

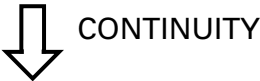


Pocket tester:  
P/N. YU-03112, 90890-03112

EB802011

1.Fuse (main)

Refer to "SWITCH INSPECTION".



NO CONTINUITY



Replace the fuse.

EB802012

2.Battery

- Check the battery condition.  
Refer to "BATTERY INSPECTION" in CHAPTER 3.

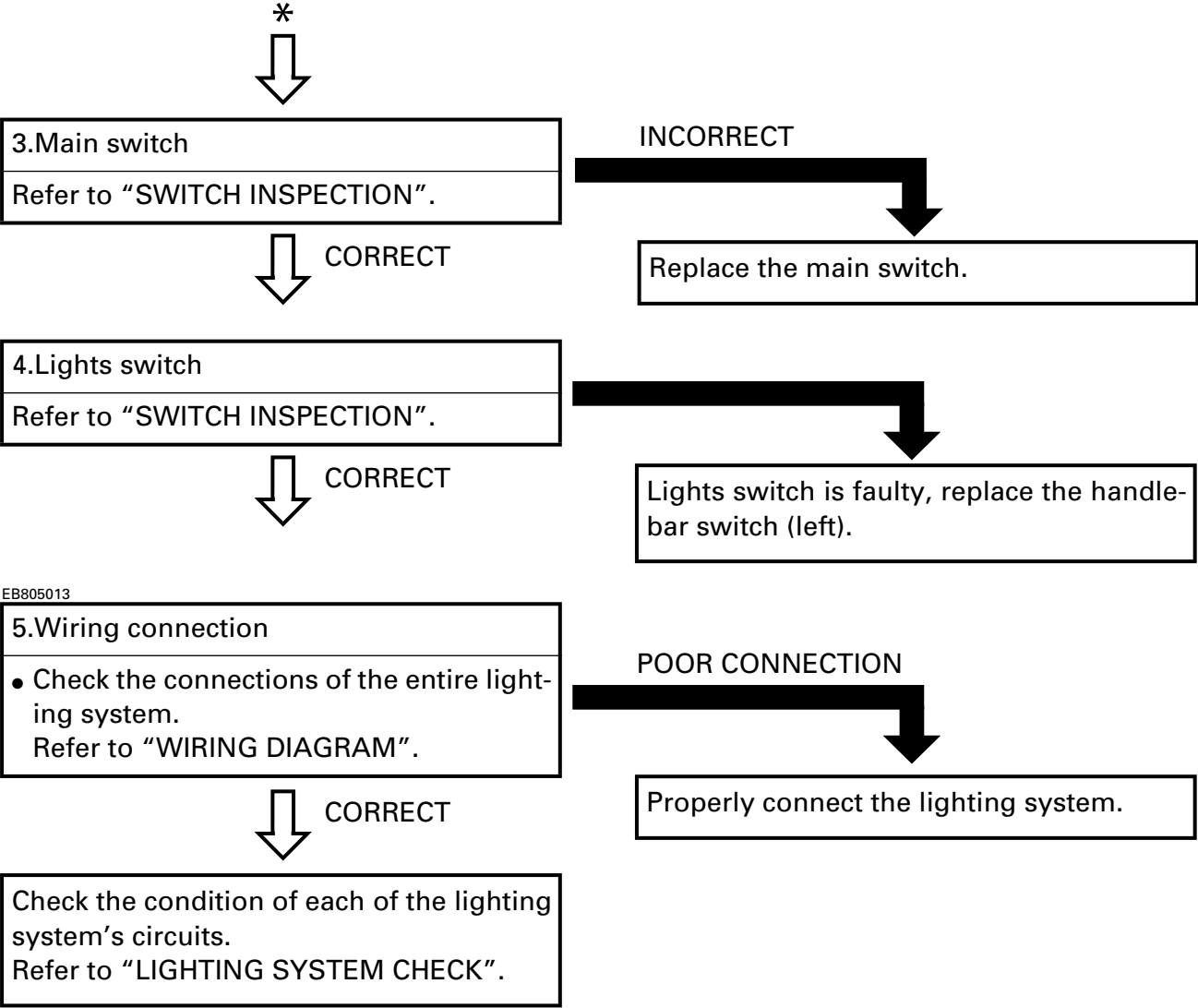
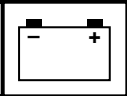
Open-circuit voltage:  
12.8 V or more at 20 °C (68 °F)

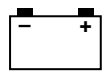


INCORRECT



- Clean the battery terminals.
- Recharge or replace the battery.





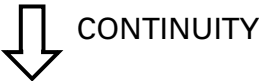
EB805020

LIGHTING SYSTEM CHECK

1.If the headlights fail to come on:

1.Bulb and bulb socket

- Check the bulb and bulb socket for continuity.



NO CONTINUITY



Replace the bulb and/or bulb socket.

2.Voltage

- Connect the pocket tester (DC 20 V) to the headlight couplers.

A

B

Tester (+) lead → **Green terminal ① or Yellow terminal ②**  
Tester (-) lead → **Black terminal ③**

A When the lights switch is on "LO".  
B When the lights switch is on "HI".

- Turn the main switch to "ON".
- Turn the lights switch to "LO" or "HI".
- Check the voltage (12V) of the "Green" and "Yellow" leads on the bulb socket connector.

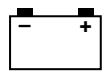


OUT OF SPECIFICATION



The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.

This circuit is not faulty.



2.If the taillight fails to come on:

1.Bulb and bulb socket

• Check the bulb and bulb socket for continuity.

↓ CONTINUITY

NO CONTINUITY

Replace the bulb and/or bulb socket.

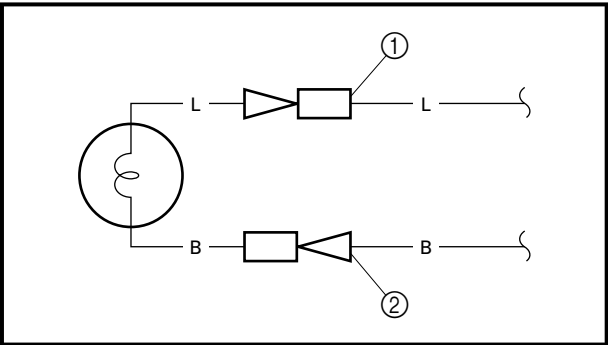
2.Voltage

• Connect the pocket tester (DC 20 V) to the taillight leads.

Tester (+) lead → Blue terminal ①  
Tester (-) lead → Black terminal ②

OUT OF SPECIFICATION

The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.



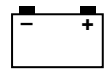
• Turn the main switch to "ON".

• Turn the lights switch to "LO" or "HI".

• Check the voltage (12V) of the "Blue" lead on the bulb socket connector.

↓ MEETS SPECIFICATION

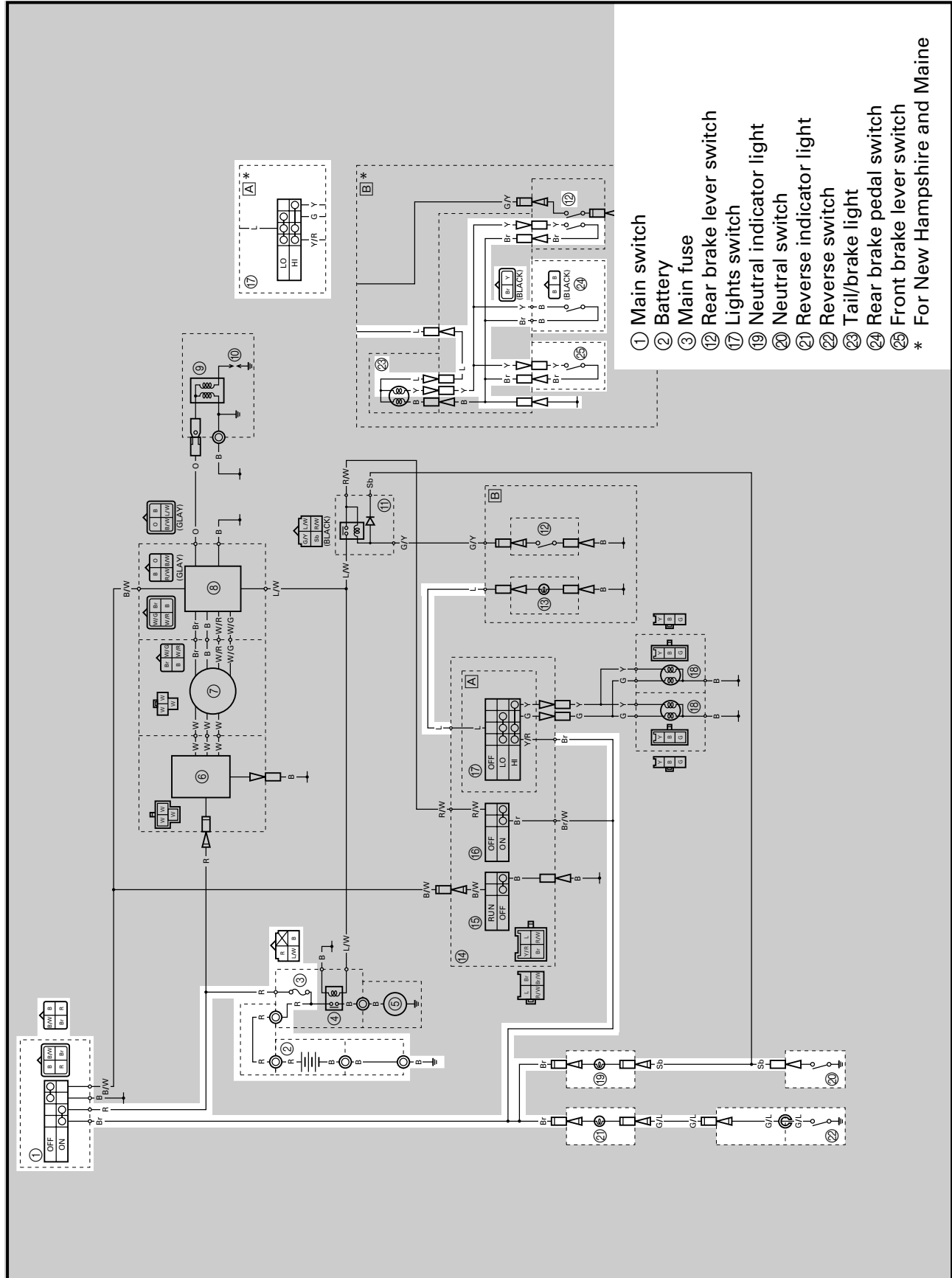
This circuit is not faulty.

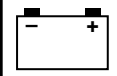


EB806000

# SIGNAL SYSTEM

## CIRCUIT DIAGRAM





EB806010

## TROUBLESHOOTING

IF THE INDICATOR LIGHT AND/OR BRAKE LIGHT FAILS TO COME ON:

**Procedure**

Check:

- 1.Fuse (main)
- 2.Battery
- 3.Main switch
- 4.Wiring connections  
(the entire signal system)

**NOTE:**

- Remove the following part(s) before troubleshooting:
  - 1)Seat
  - 2)Front carrier
  - 3)Front fender
- Use the following special tool(s) for troubleshooting.

**Pocket tester:****P/N. YU-03112, 90890-03112**

EB802011

**1.Fuse (main)**

Refer to "SWITCH INSPECTION".

NO CONTINUITY



CONTINUITY

Replace the fuse.

EB802012

**2.Battery**

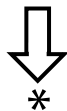
- Check the battery condition.  
Refer to "BATTERY INSPECTION" in CHAPTER 3.

**Open-circuit voltage:**  
12.8 V or more at 20 °C (68 °F)

INCORRECT

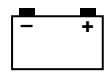


- Clean the battery terminals.
- Recharge or replace the battery.



CORRECT



**3. Main switch**

Refer to "SWITCH INSPECTION".

INCORRECT

Replace the main switch.



CORRECT

EB806011

**4. Wiring connections**

- Check the connections of the entire signal system.  
Refer to "CIRCUIT DIAGRAM".

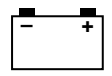
POOR CONNECTION

Properly connect the signal system.



CORRECT

Check the condition of each of the signal system's circuits.  
Refer to "SIGNAL SYSTEM CHECK".



## SIGNAL SYSTEM CHECK

EB806024

1.If the neutral indicator light fails to come on:

### 1.Bulb and bulb socket

- Check the bulb and bulb socket for continuity.



CONTINUITY

NO CONTINUITY



Replace the bulb and/or bulb socket.

### 2.Neutral switch

Refer to "SWITCH INSPECTION".



CONTINUITY

NO CONTINUITY

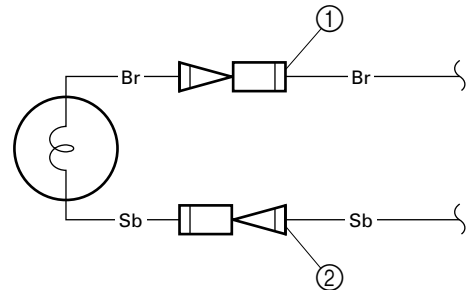


Replace the neutral switch.

### 3.Voltage

- Connect the pocket tester (DC 20 V) to the bulb socket leads.

**Tester (+) lead** → **Brown terminal** ①  
**Tester (-) lead** → **Sky blue terminal** ②



- Turn the main switch to "ON".
- Check the voltage (12 V).

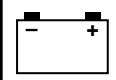
MEETS  
SPECIFICATION

OUT OF SPECIFICATION



This circuit is not faulty.

The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.



2.If the reverse indicator light fails to come on:

1.Bulb and bulb socket

- Check the bulb and bulb socket for continuity.



CONTINUITY

NO CONTINUITY



Replace the bulb and/or bulb socket.

2.Reverse switch

Refer to "SWITCH INSPECTION".



CONTINUITY

NO CONTINUITY

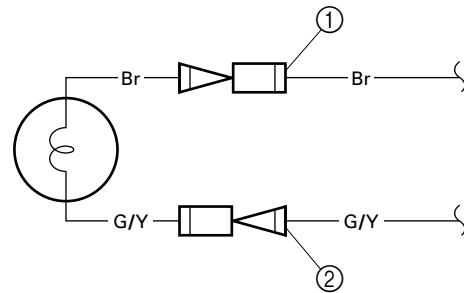


Replace the reverse switch.

3.Voltage

- Connect the pocket tester (DC 20 V) to the bulb socket leads.

**Tester (+) lead → Brown terminal ①**  
**Tester (-) lead → Green/Blue terminal ②**



- Turn the main switch to "ON".
- Check the voltage (12 V).



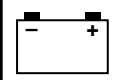
MEETS  
SPECIFICATION

OUT OF SPECIFICATION



This circuit is not faulty.

The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.



3.If the brake light fails to come on:  
(for New Hampshire and Maine)

1.Bulb and bulb socket

- Check the bulb and bulb socket for continuity.



CONTINUITY

NO CONTINUITY



Replace the bulb and/or bulb socket.

2.Brake switch

Refer to "SWITCH INSPECTION".



CONTINUITY

NO CONDITION



Replace the brake switches.

3.Lights switch

Refer to "SWITCH INSPECTION".



CONTINUITY

NO CONDITION

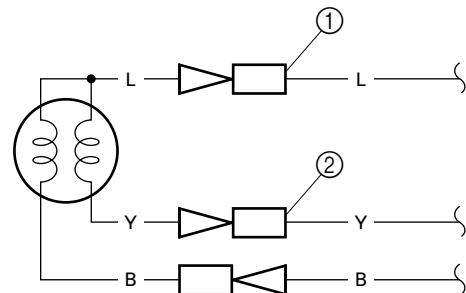


Replace the lights switch.

4.Voltage

- Connect the pocket tester (DC 20 V) to the bulb socket leads.

**Tester (+) lead → Blue terminal ①**  
**Tester (-) lead → Yellow terminal ②**



OUT OF SPECIFICATION



The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.

- Turn the main switch to "ON".
- Check the voltage (12 V).



MEETS  
SPECIFICATION

This circuit is not faulty.

**TROUBLESHOOTING****NOTE:**

The following troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to troubleshooting. Refer to the relative procedure in this manual for inspection, adjustment and replacement of parts.

**STARTING FAILURE/HARD STARTING****FUEL SYSTEM****Fuel tank**

- Empty
- Clogged fuel filter
- Clogged fuel strainer
- Clogged fuel breather hose
- Deteriorated or contaminated fuel

**Fuel cock**

- Clogged fuel hose

**Carburetor**

- Deteriorated or contaminated fuel
- Clogged pilot jet
- Clogged pilot air passage
- Sucked-in air
- Deformed float
- Worn needle valve
- Improperly sealed valve seat
- Improperly adjusted fuel level
- Improperly set pilot jet
- Clogged starter jet
- Starter plunger malfunction

**Air filter**

- Clogged air filter element

**ELECTRICAL SYSTEM****Spark plug**

- Improper plug gap
- Worn electrodes
- Wire between terminals broken
- Improper heat range
- Faulty spark plug cap

**Ignition coil**

- Broken or shorted primary/secondary
- Faulty spark plug lead
- Broken body

**CDI system**

- Faulty CDI unit
- Faulty pickup coil
- Faulty source coil
- Broken woodruff key

**Switches and wiring**

- Faulty main switch
- Faulty engine stop switch
- Broken or shorted wiring
- Faulty neutral switch
- Faulty start switch
- Faulty rear brake lever switch

**Starter motor**

- Faulty starter motor
- Faulty starter relay
- Faulty starter circuit cut-off relay
- Faulty starter clutch

## **COMPRESSION SYSTEM**

### **Cylinder and cylinder head**

- Loose spark plug
- Loose cylinder head or cylinder
- Broken cylinder head gasket
- Worn, damaged or seized cylinder

### **Piston and piston rings**

- Improperly installed piston ring
- Worn, fatigued or broken piston ring
- Seized piston ring
- Seized or damaged piston

### **Valve, camshaft and crankshaft**

- Improperly sealed valve
- Improperly contacted valve and valve seat
- Improper valve timing
- Broken valve spring
- Seized camshaft
- Seized crankshaft

## **POOR IDLE SPEED PERFORMANCE**

### **POOR IDLE SPEED PERFORMANCE**

#### **Carburetor**

- Improperly returned starter plunger
- Loose pilot jet
- Clogged pilot jet
- Clogged pilot air jet
- Improperly adjusted idle speed  
(Throttle stop screw)
- Improper throttle cable play
- Flooded carburetor

#### **Electrical system**

- Faulty spark plug
- Faulty CDI unit
- Faulty pickup coil
- Faulty source coil
- Faulty ignition coil

#### **Valve train**

- Improperly adjusted valve clearance

#### **Air filter**

- Clogged air filter element

## **POOR MEDIUM AND HIGH-SPEED PERFORMANCE**

### **POOR MEDIUM AND HIGH-SPEED PERFORMANCE**

Refer to "STARTING FAILURE/HARD STARTING" and "POOR IDLE SPEED PERFORMANCE-VALVE TRAIN".

#### **Carburetor**

- Improper jet needle clip position
- Improperly adjusted fuel level
- Clogged or loose main jet
- Deteriorated or contaminated fuel

#### **Air filter**

- Clogged air filter element

## FAULTY DRIVE TRAIN

The following conditions may indicate damaged shaft drive components:

Symptoms	Possible Causes
1.A pronounced hesitation or "jerky" movement during acceleration, deceleration, or sustained speed. (This must not be confused with engine surging or transmission characteristics.) 2.A "rolling rumble" noticeable at low speed; a high-pitched whine; a "clunk" from a shaft drive component or area. 3.A locked-up condition of the shaft drive mechanism, no power transmitted from the engine to the rear wheels.	A.Bearing damage. B.Improper gear lash. C.Gear tooth damage. D.Broken drive shaft. E.Broken gear teeth. F.Seizure due to lack of lubrication. G.Small foreign objects lodged between the moving parts.

### NOTE:

Areas A, B, and C above may be extremely difficult to diagnose. The symptoms are quite subtle and difficult to distinguish from normal machine operating noise. If there is reason to believe these components are damaged, remove the components and inspect them.

## FAULTY GEAR SHIFTING

### HARD SHIFTING

Refer to "CLUTCH SLIPPING/Dragging-CLUTCH Dragging".

#### SHIFT PEDAL DOES NOT MOVE

##### Shift shaft

- Bent shift shaft

##### Shift cam, shift fork

- Groove jammed with impurities
- Seized shift fork
- Bent shift fork guide bar

##### Transmission

- Seized transmission gear
- Jammed impurities
- Incorrectly assembled transmission

##### Shift guide

- Broken shift guide

#### JUMPS OUT OF GEAR

##### Shift shaft

- Improperly adjusted shift lever position
- Improperly returned stopper lever

##### Shift fork

- Worn shift fork

##### Shift cam

- Improper thrust play
- Worn shift cam groove

##### Transmission

- Worn gear dog

## CLUTCH SLIPPING

### CLUTCH SLIPPING

#### Clutch

- Improperly adjusted clutch release lever free play
- Loose clutch spring (primary and/or secondary)
- Fatigued clutch spring (primary and/or secondary)
- Worn friction plate
- Worn clutch plate
- Worn clutch shoe (primary)

#### Engine oil

- Low oil level
- Improper quality (low viscosity)
- Deterioration

## CLUTCH DRAGGING

### CLUTCH DRAGGING

#### Clutch

- Improperly adjusted clutch release lever free play
- Improper engagement of release lever and push rod
- Warped clutch plate
- Swollen friction plate
- Broken clutch boss

#### Engine oil

- High oil level
- Improper quality (high viscosity)
- Deterioration



## **OVERHEATING**

### **OVERHEATING**

#### **Ignition system**

- Improper spark plug gap
- Improper spark plug heat range
- Faulty CDI unit

#### **Fuel system**

- Improper carburetor main jet (improper setting)
- Improper fuel level
- Clogged air filter element

#### **Compression system**

- Heavy carbon build-up

#### **Engine oil**

- Improper oil level
- Improper oil viscosity
- Inferior oil quality

#### **Brake**

- Brake drag

## **FAULTY BRAKE**

### **POOR BRAKING EFFECT**

#### **Drum brake**

- Worn brake shoe lining
- Worn brake drum
- Oily or greasy brake shoe lining
- Oily or greasy brake drum
- Improperly adjusted brake free play
- Improper brake cam lever position
- Fatigued/damaged return spring
- Broken brake cable

## **SHOCK ABSORBER MALFUNCTION**

### **MALFUNCTION**

- Bent or damaged damper rod
- Damaged oil seal lip
- Fatigued shock absorber spring

## **UNSTABLE HANDLING**

### **UNSTABLE HANDLING**

#### **Handlebar**

- Improperly installed or bent

#### **Steering**

- Incorrect toe-in
- Bent steering shaft
- Improperly installed steering shaft
- Damaged bearing or bearing race
- Bent tie rods
- Deformed steering knuckles

#### **Tires**

- Uneven tire pressures on both sides
- Incorrect tire pressure
- Uneven tire wear

## **LIGHTING SYSTEM**

### **HEADLIGHT DARK**

- Improper bulb
- Too many electric accessories
- Hard charging (broken stator coil and/or faulty rectifier/regulator)
- Incorrect connection
- Improperly grounded
- Poor contacts (main or lights switch)
- Bulb life expired

### **Wheels**

- Deformed wheel
- Loose bearing
- Bent or loose wheel axle
- Excessive wheel runout

### **Frame**

- Bent
- Damaged frame

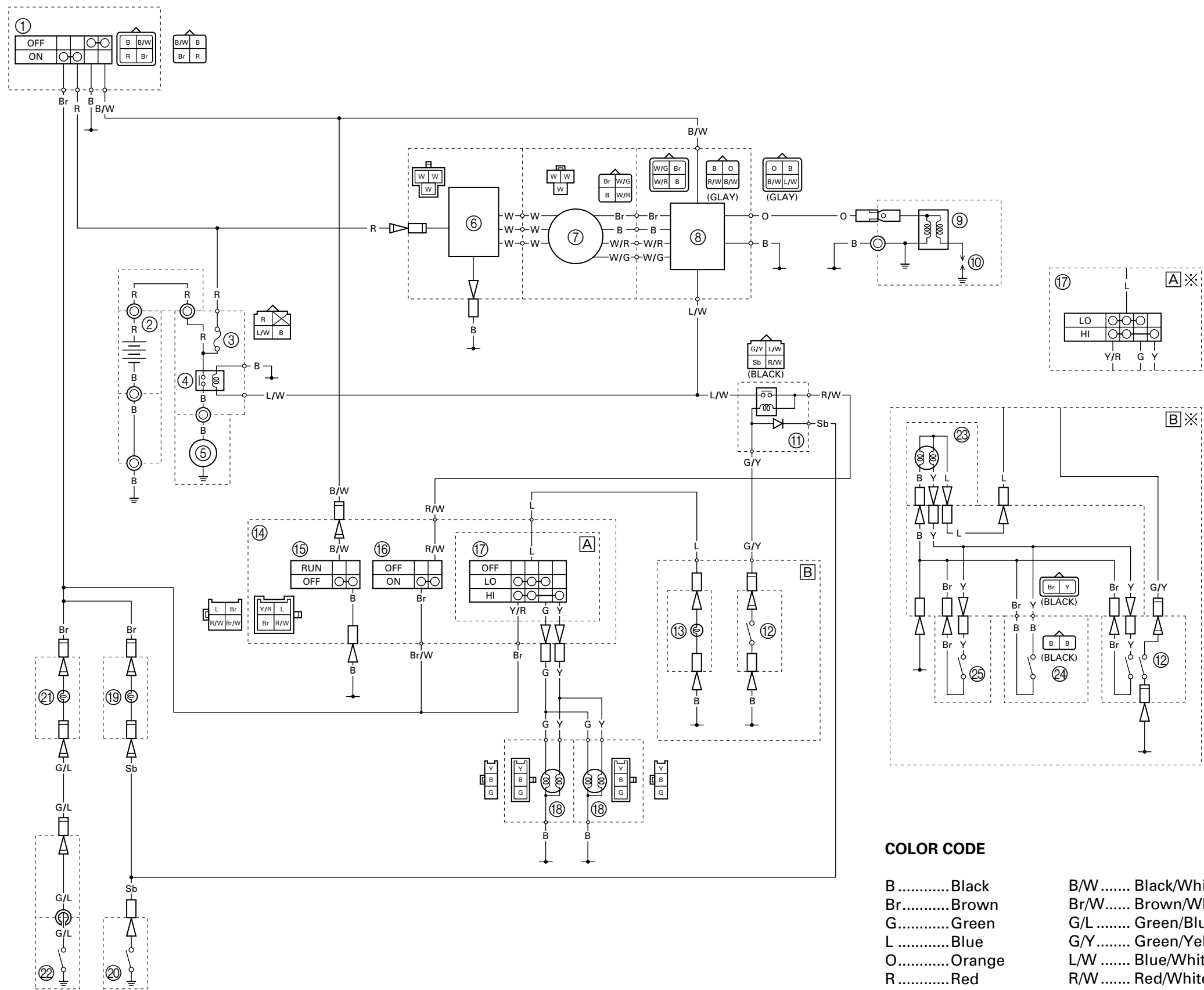
### **Swingarm**

- Worn bearing or bushing
- Bent or damaged

### **BULB BURNT OUT**

- Improper bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded
- Faulty main and/or lights switch
- Bulb life expired

YFM250XL WIRING DIAGRAM



- ① Main switch
- ② Battery
- ③ Fuse
- ④ Starter relay
- ⑤ Starter motor
- ⑥ Rectifier / regulator
- ⑦ CDI magneto
- ⑧ CDI unit
- ⑨ Ignition coil
- ⑩ Spark plug
- ⑪ Starting circuit cut-off relay
- ⑫ Rear brake lever switch
- ⑬ Tail light
- ⑭ Handlebar switch
- ⑮ Engine stop switch
- ⑯ Starter switch
- ⑰ Lights switch
- ⑱ Headlight
- ⑲ Neutral indicator light
- ⑳ Neutral switch
- ㉑ Reverse indicator light
- ㉒ Reverse switch
- ㉓ Tail/brake light
- ㉔ Rear brake pedal switch
- ㉕ Front brake lever switch
- \* For new hampshire and maine

COLOR CODE

B .....	Black	B/W .....	Black/White
Br .....	Brown	Br/W .....	Brown/White
G .....	Green	G/L .....	Green/Blue
L .....	Blue	G/Y .....	Green/Yellow
O .....	Orange	L/W .....	Blue/White
R .....	Red	R/W .....	Red/White
Sb .....	Sky blue	W/G .....	White/Green
W .....	White	W/R .....	White/Red
Y .....	Yellow	Y/R .....	Yellow/Red

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2500 SHINGAI IWATA SHIZUOKA JAPAN

PRINTED IN U.S.A.



# **YFM250XN**

# **SUPPLEMENTARY SERVICE MANUAL**

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## **FOREWORD**

This Supplementary Service Manual has been prepared to introduce new service and new data for the YFM250XN. For complete information on service procedures, it is necessary to use this Supplementary Service Manual together with the following manual.

<b>YFM250XL(C) SERVICE MANUAL: 4XE-F8197-10</b>
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<p><b>YFM250XN SUPPLEMENTARY SERVICE MANUAL</b></p>
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<p><b>Printed in U.S.A. LIT-11616-14-17</b></p>
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## NOTICE

This manual was produced by the Yamaha Motor Company primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual, so it is assumed that anyone who uses this book to perform maintenance and repairs on Yamaha machine has a basic understanding of the mechanical ideas and the procedures of machine repair. Repairs attempted by anyone without this knowledge are likely to render the machine unsafe and unfit for use.

Yamaha Motor Company, Ltd. is continually striving to improve all its models. Modifications and significant changes in specifications or procedures will be forwarded to all authorized Yamaha dealers and will appear in future editions of this manual where applicable.

**NOTE:**

---

Designs and specifications are subject to change without notice.

---

## IMPORTANT INFORMATION

Particularly important information is distinguished in this manual by the following notations.



The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

**⚠ WARNING**

Failure to follow WARNING instructions could result in severe injury or death to the machine operator, a bystander or a person inspecting or repairing the machine.

**CAUTION:**

A CAUTION indicates special precautions that must be taken to avoid damage to the machine.

**NOTE:**

A NOTE provides key information to make procedures easier or clearer.

# HOW TO USE THIS MANUAL

## MANUAL ORGANIZATION

This manual is intended as a handy, easy-to-read reference book for the mechanic. It is divided into chapters, sections and sub-sections. Comprehensive explanations of all installation, removal, disassembly, assembly, repair and inspection procedures are laid out with the individual steps in sequential order.

## PAGE FEATURES

The circled numbers below refer to the features indicated in the sample page.

① : An abbreviation and symbol in the upper right corner of each page indicates the current chapter.

② : The current section title is shown at the top of each page.†

③ : Sub-section titles appear in smaller print than the section title.†

④ : Lines of asterisks (\*) mark the beginning and end of a particularly important procedure. The steps of such procedures are marked with bullets (•).

⑤ : Important information such as fluids, special tools and torques are framed and marked with a corresponding symbol.

⑥ : A circled number refers to an illustrated part.

⑦ : A circled lower case letter refers to an illustrated dimension or alignment mark.

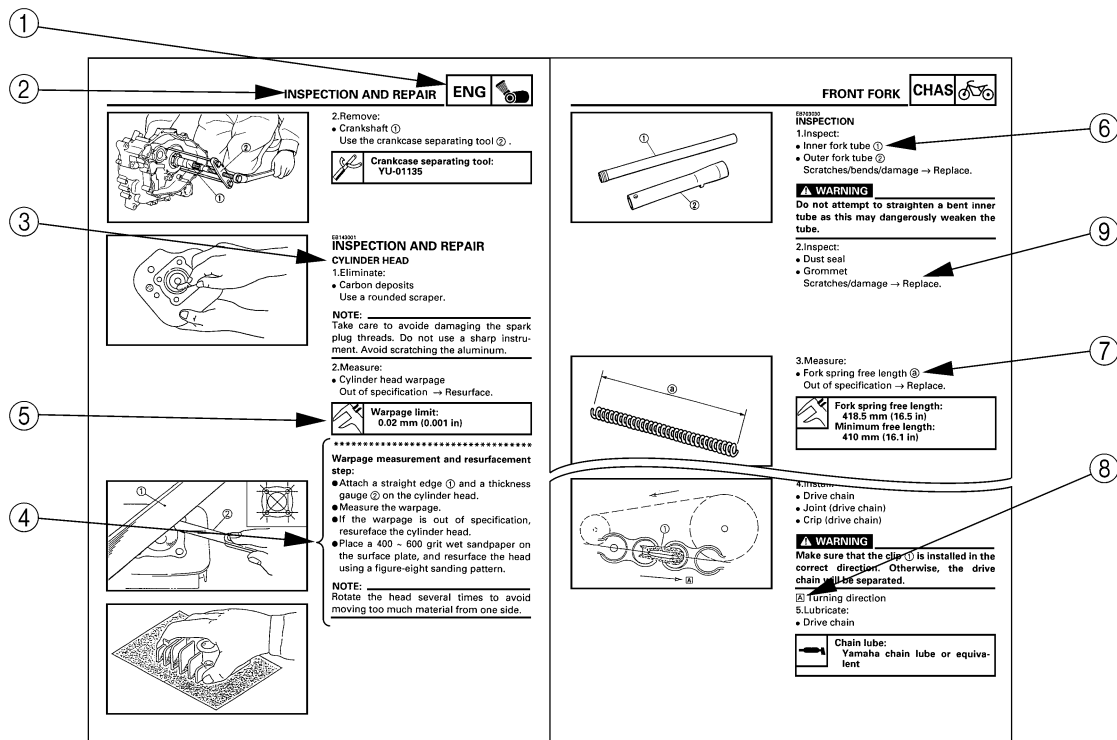
⑧ : An upper case letter in a box refers to other illustrated details.

⑨ : An arrow mark after a given defect suggests the recommended course of action.

† : In Chapter 3, "Periodic Inspection and Adjustment", it is usually the current sub-section title that appears at the top of each page, instead of the current section title.

## EXPLODED DIAGRAMS

To help identify parts and clarify procedure steps, there are exploded diagrams at the start of each disassembly section.





## ILLUSTRATED SYMBOLS

Illustrated symbols ① to ⑨ are printed on the top right of each page and indicate the subject of each chapter.

- ① General information
- ② Specifications
- ③ Periodic inspections and adjustments
- ④ Engine
- ⑤ Carburetion
- ⑥ Drive train
- ⑦ Chassis
- ⑧ Electrical
- ⑨ Troubleshooting

Illustrated symbols ⑩ to ⑯ are used to identify the specifications appearing in the text.

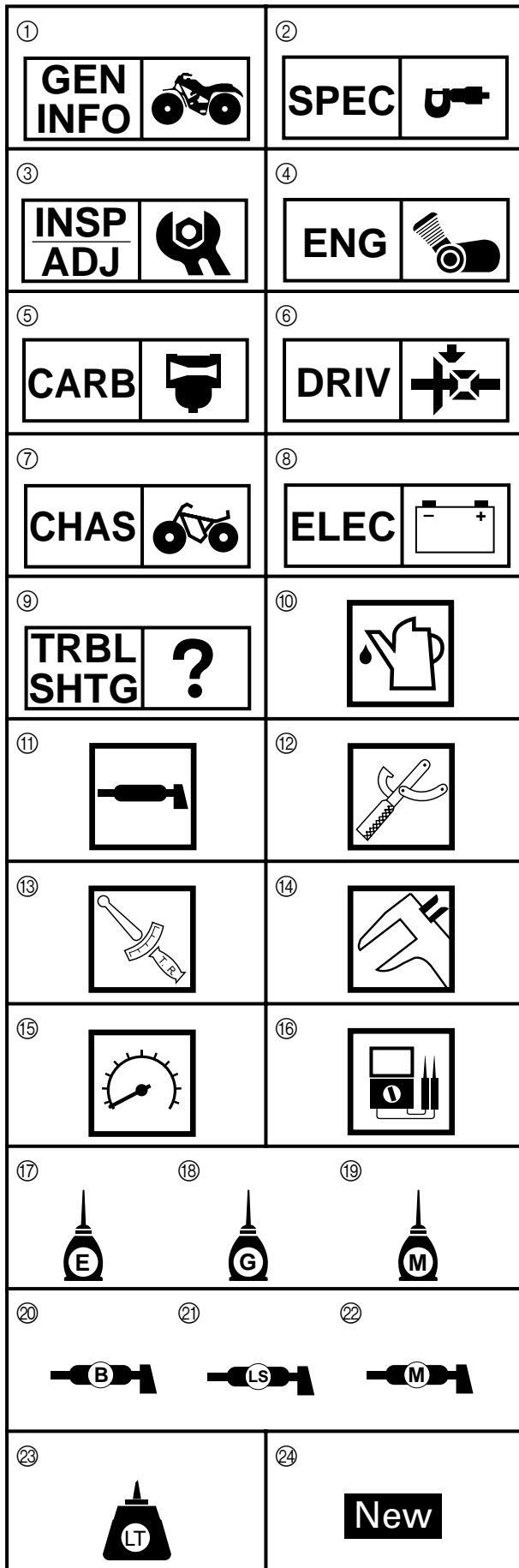
- ⑩ Filling fluid
- ⑪ Lubricant
- ⑫ Special tool
- ⑬ Torque
- ⑭ Wear limit, clearance
- ⑮ Engine speed
- ⑯  $\Omega$ , V, A

Illustrated symbols ⑰ to ⑳ in the exploded diagrams indicate the types of lubricants and lubrication points.

- ⑰ Apply engine oil
- ⑱ Apply gear oil
- ⑲ Apply molybdenum disulfide oil
- ⑳ Apply wheel bearing grease
- ㉑ Apply lightweight lithium-soap base grease
- ㉒ Apply molybdenum disulfide grease

Illustrated symbols ㉓ to ㉔ in the exploded diagrams indicate where to apply a locking agent ㉓ and when to install a new part ㉔.

- ㉓ Apply the locking agent (LOCTITE®)
- ㉔ Replace



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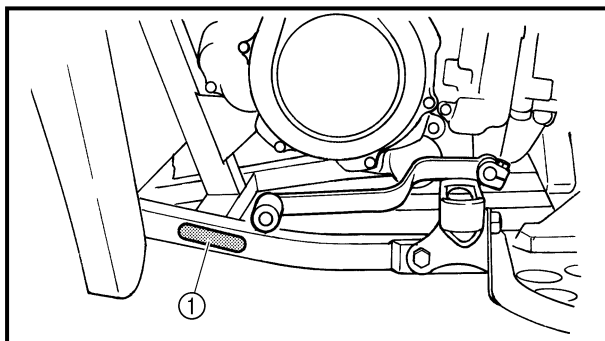
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## **YFM250XN WIRING DIAGRAM**

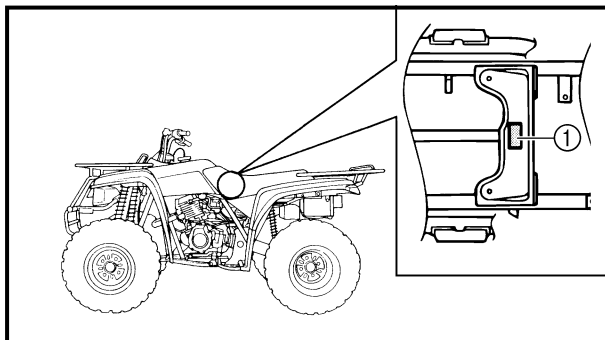


## GENERAL INFORMATION

### MACHINE IDENTIFICATION

#### VEHICLE IDENTIFICATION NUMBER

The vehicle identification number ① is stamped into the left side of the frame.



#### MODEL LABEL

The model label ① is affixed to the frame. This information will be needed to order spare parts.



## SPECIFICATIONS

## GENERAL SPECIFICATIONS

Item		Standard
Model code:		4XEA (USA)
Dimensions:		
Overall length		1,940 mm (76.4 in)
Overall width		1,005 mm (39.6 in)
Overall height		1,118 mm (44.0 in)
Seat height		780 mm (30.7 in)
Wheelbase		1,170 mm (46.1 in)
Minimum ground clearance		150 mm (5.9 in)
Minimum turning radius		2,900 mm (114 in)
Basic weight:		
With oil and full fuel tank		212 kg (467 lb)
Tire:		
Type		Tubeless
Size	front	AT22 × 7-10
	rear	AT22 × 10-10
Manufacturer	front	CARLISLE/DUNLOP/CHENG SHIN
	rear	CARLISLE/DUNLOP/CHENG SHIN
Type	front	TRAIL WOLF/KT701/M905
	rear	TRAIL WOLF/KT705/M906
Brake:		
Front brake	type	Single disc brake
	operation	Right hand operation
Rear brake	type	Drum brake (full sealed)
	operation	Left hand and right foot operation
Electrical:		
Ignition system		DC. C.D.I.
Generator system		A.C. magneto
Battery type		GM14AZ-4A
Battery capacity		12 V 14 AH
Headlight:		
Type		Bulb type
Bulb type		Incandescence
Bulb wattage × quantity:		
Headlight		12 V 25 W/25 W × 2
Tail light		12 V 7.5 W × 1
Indicator lights:		
Neutral		12 V 1.7 W × 1
Reverse		12 V 1.7 W × 1



# MAINTENANCE SPECIFICATIONS

## ENGINE

Item	Standard	Limit
Shifter:		
Shifter type	Shift drum and guide bar	----
Guide bar bending limit	----	0.8 mm (0.032 in)
Carburetor:		
I. D. mark	4XEA 12	----
Main jet (M.J)	#95	----
Main air jet (M.A.J)	0.7	----
Jet needle (J.N)	5CE35-2	----
Needle jet (N.J)	P-2M (#823)	----
Pilot air jet (P.A.J.1)	#80	----
Pilot air jet (P.A.J.2)	1.3	----
Pilot outlet (P.O)	0.85	----
Pilot jet (P.J)	#42.5	----
Bypass 1 (B.P.1)	0.8	----
Bypass 2 (B.P.2)	0.8	----
Bypass 3 (B.P.3)	0.8	----
Valve seat size (V.S)	2.0	----
Starter jet (G.S.1)	#50	----
(G.S.2)	0.7	----
Throttle valve size (Th.V)	#130	----
Float height (F.H)	12.0 ~ 14.0mm (0.47 ~ 0.55 in)	----
Fuel level (F.L)	1.0 ~ 2.0 mm (0.04 ~ 0.08 in)	----
Engine idle speed	1,400 ~ 1,500 r/min	----
Intake vacuum	30.7 kPa (230 mmHg, 9.06 inHg)	----



## CHASSIS

Item	Standard	Limit
Rear suspension:		
Shock absorber travel	85 mm (3.35 in)	----
Suspension spring free length	268 mm (10.55 in)	----
Fitting length	244 mm (9.61 in)	----
Spring rate	39 N/mm (3.9 kg/mm, 222.69 lb/in)/ 0 ~ 85 mm (0 ~ 3.35 in)	----
Optional spring	No	----
Front wheel:		
Type	Disc wheel	----
Rim size	10 × 6.0AT	----
Rim material	Steel	----
Rim runout limit radial	----	2.0 mm (0.08 in)
lateral	----	2.0 mm (0.08 in)
Front disc brake:		
Type	Single	----
Disc outside diameter × thickness	161 × 3.5 mm (6.34 × 0.14 in)	----
Pad thickness	4.5 mm (0.18 in)	1.0 mm (0.04 in)
Master cylinder inside diameter	14 mm (0.55 in)	----
Caliper cylinder inside diameter	32 mm (1.26 in)	----
Brake fluid type	DOT 4	----



**Tightening torques**

Part to be tightened	Parts name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Front panel wheel and wheel hub	Nut	M10 × 1.25	8	55	5.5	40	
Wheel hub and steering knuckle	Nut	M14 × 1.5	2	70	7.0	50	
Steering knuckle and brake caliper	Bolt	M8 × 1.25	4	30	3.0	22	
Brake disc and wheel hub	Bolt	M8 × 1.25	8	16	1.6	11	
Master cylinder and brake hose	Bolt	M10 × 1.25	1	27	2.7	19	
Brake caliper and brake hose	Bolt	M10 × 1.25	2	27	2.7	19	
Brake pipe and brake hose	Nut	M10 × 1.0	2	19	1.9	13	
Brake hose and frame	Bolt	M6 × 1.0	1	7	0.7	5.1	
Caliper bleed screw	Bolt	M8 × 1.25	2	6	0.6	4.3	
Master cylinder and handlebar	Bolt	M6 × 1.0	2	7	0.7	5.1	
Brake caliper and caliper bracket	Bolt	M8 × 1.25	2	23	2.3	17	
Brake pad retaining	Bolt	M10 × 1.25	2	18	1.8	13	
Steering knuckle and brake disc guard	Bolt	M6 × 1.0	2	7	0.7	5.1	
Front lower arm and steering knuckle	Nut	M12 × 1.25	2	30	3.0	22	
Engine mounting (upper)	Nut	M8 × 1.25	1	48	4.8	35	
Engine mounting (rear-upper)	Nut	M8 × 1.25	1	48	4.8	35	
Engine mounting (rear-lower)	Nut	M8 × 1.25	1	48	4.8	35	





### ELECTRICAL

Item	Standard	Limit
C.D.I.:		
Magneto model/manufacturer	F4T259/MITSUBISHI	----
Pickup coil resistance/color	189 ~ 231 $\Omega$ at 20°C (68°F)/ White/Green – White/Red	----
Charging/rotor rotation direction detection coil resistance/color	270 ~ 330 $\Omega$ at 20°C (68°F)/ Red/White/Blue	----
C.D.I. unit model/manufacturer	F8T19871/MITSUBISHI	----
Charging system:		
Type	A.C. magneto	----
Nominal output	14 V 16 A 5,000 r/min	----
Stator coil resistance/color	0.49 ~ 0.59 $\Omega$ at 20°C (68°F)/ White – White	----
Rectifier/regulator:		
Regulator type	Semi conductor-short circuit	----
Model/manufacturer	SH640E-11/SHINDENGEN	----
No load regulated voltage	14.1 ~ 14.9 V	----
Rectifier capacity	14 A	----
Electric starter system:		
Type	Constant mesh type	----
Starter motor:		
Model/manufacturer	SM-14/MITSUBA	----
Output	0.5 kW	----
Armature coil resistance	0.004 ~ 0.005 $\Omega$ at 20°C (68°F)	----
Brush overall length	10 mm (0.4 in)	3.5 mm (0.14 in)
Spring force	730 ~ 970 g (7.16 ~ 9.52 N)	----
Commutator diameter	28 mm (1.10 in)	27 mm (1.06 in)
Mica undercut	0.7 mm (0.028 in)	----
Starter relay:		
Model/manufacturer	MS5F-721/JIDECO	----
Amperage rating	180 A	----
Coil winding resistance/color	4.2 ~ 4.6 $\Omega$ at 20°C (68°F)/ Blue/Black - Blue/White	----
Circuit breaker:		
Type	Fuse	----
Amperage for individual circuit:		
Main fuse	20 A $\times$ 1	----
Reserve	20 A $\times$ 1	----

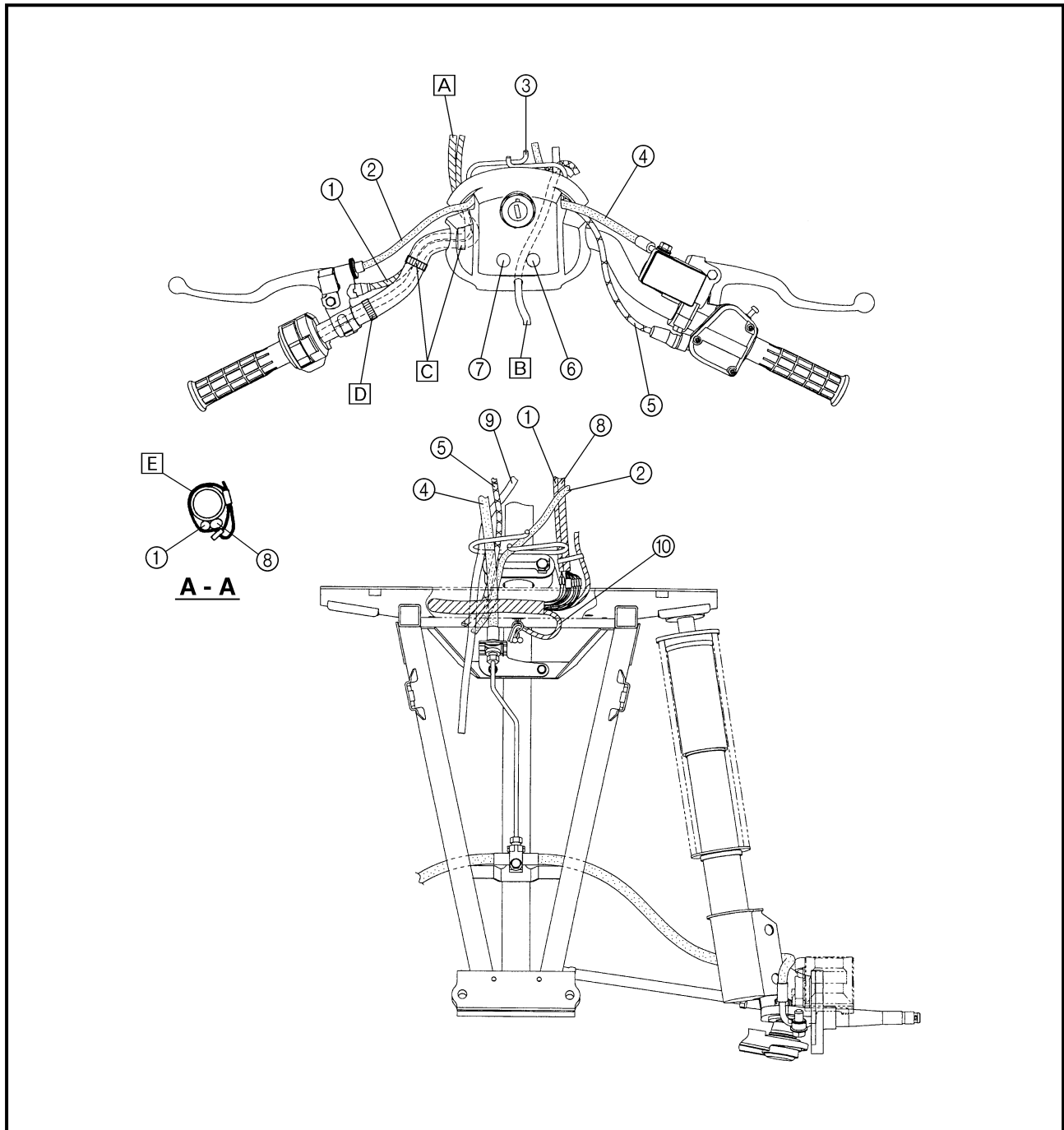


## CABLE ROUTING

- ① Rear brake lever switch lead
- ② Rear brake cable
- ③ Cable guide
- ④ Front brake hose
- ⑤ Throttle cable
- ⑥ Neutral indicator light
- ⑦ Reverse indicator light
- ⑧ Handlebar switch assembly lead
- ⑨ Fuel tank breather hose
- ⑩ Headlight leads

- [A] Do not route the handlebar switch assembly lead through the lower bracket cable guide.
- [B] Route the fuel tank breather hose through the hole in the handlebar cover and then to the right of the handlebar (below the handlebar, not over it). Then, pass the hose through the cable guide.

- [C] Fasten the handlebar switch assembly lead and rear brake lever switch lead to the handlebar with the plastic bands.
- [D] Fasten the handlebar switch assembly lead to the handlebar with the plastic band.
- [E] Fasten the handlebar switch assembly lead and rear brake lever switch lead underneath the handlebar. Position the plastic band with its tab facing down.



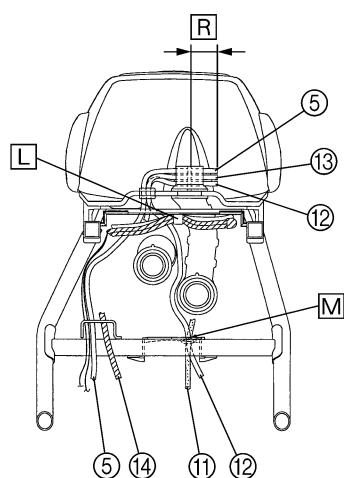
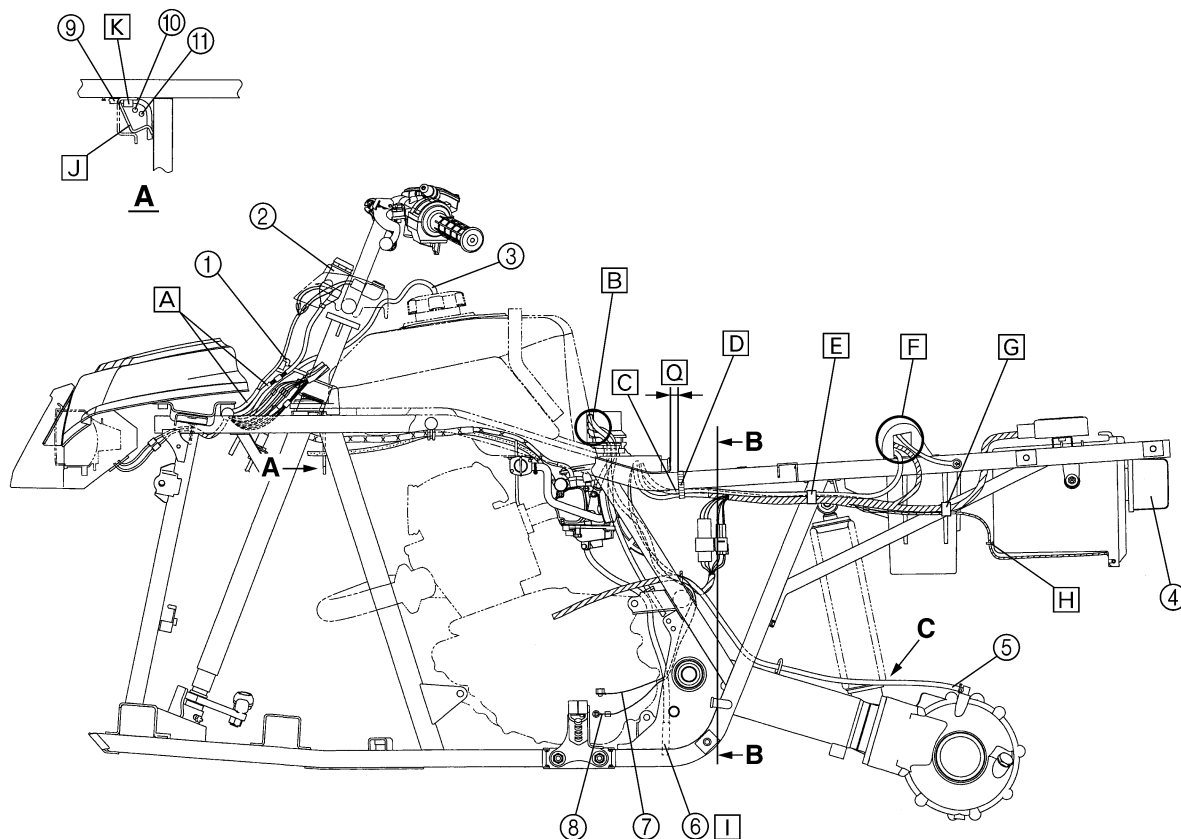


- ① Cable guide
- ② Main switch
- ③ Fuel tank breather hose
- ④ Taillight
- ⑤ Final gear case breather hose
- ⑥ Carburetor overflow hose
- ⑦ Reverse switch lead
- ⑧ Neutral switch lead
- ⑨ Starter motor lead
- ⑩ Throttle cable
- ⑪ Rear brake cable

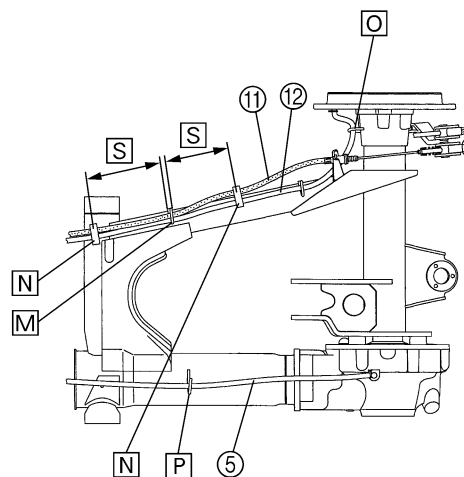
- ⑫ Rear brake breather hose
- ⑬ Carburetor air vent hose
- ⑭ CDI magneto lead

**[A]** Route the main switch lead and indicator light lead to the side of the cable guide.

**[B]** Insert the carburetor air vent hose, rear brake breather hose, and final gear case breather hose into the air duct after routing them through the fuel tank grommet.



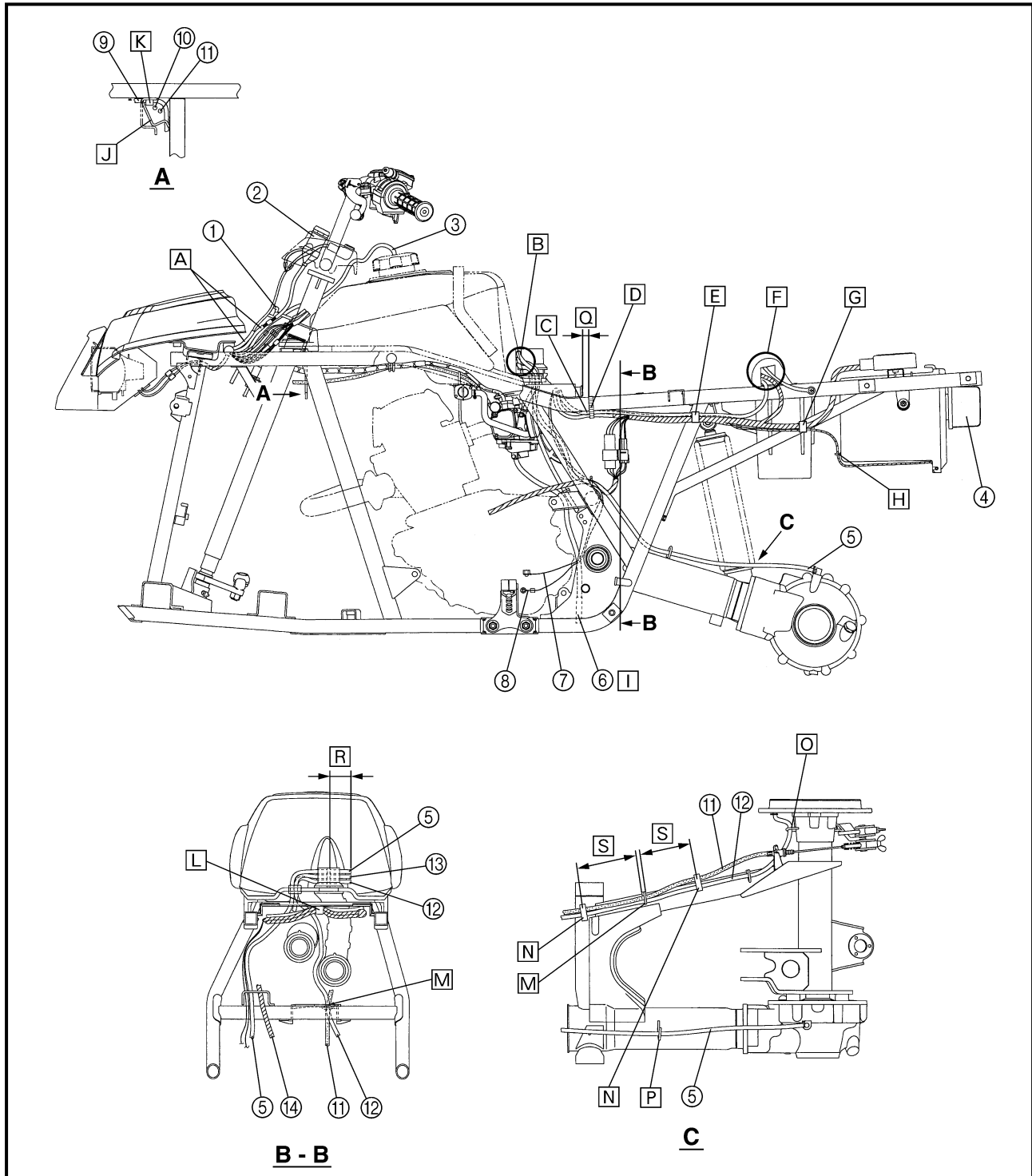
**B - B**



**C**

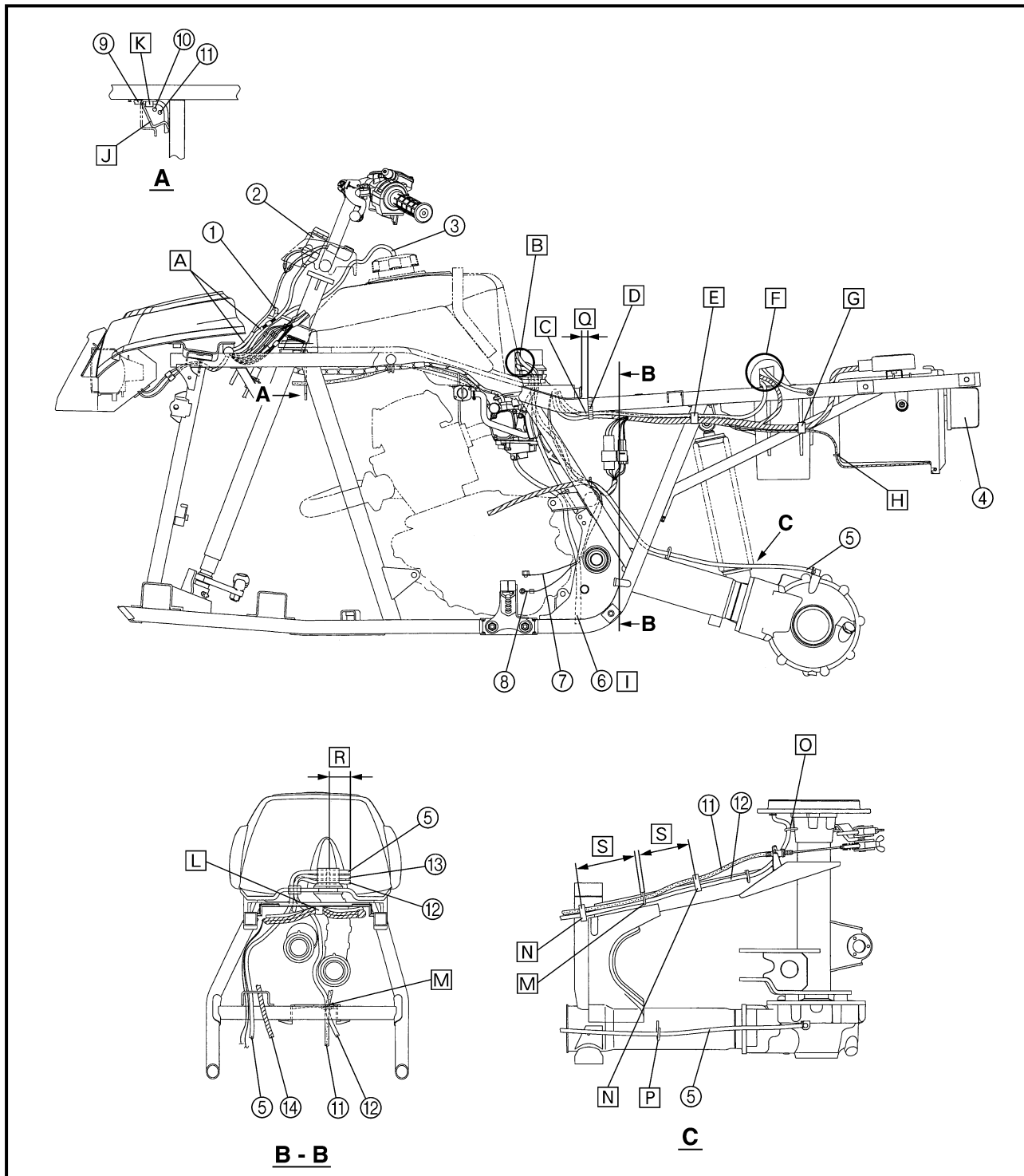


- [C] Make sure that the starter motor lead is not slacked.
- [D] Fasten the starter motor lead and wire harness to the frame with the plastic band.
- [E] Fasten the starter motor lead and wire harness to the frame with the plastic clamp.
- [F] Route the starter motor lead, wire harness, and battery  $\ominus$  lead through the hole in the rear fender.
- [G] Fasten the taillight lead and wire harness to the frame with the plastic clamp.
- [H] Fasten the taillight lead to the box with the plastic clamp.
- [I] Route the carburetor overflow hose between the engine and upper rear engine mount and then between the engine and swingarm. Make sure that the hose is not pinched.
- [J] Bend the cable guide after routing the cables.
- [K] Fasten the starter motor lead to the frame with the plastic clamp. Route the starter motor lead over the throttle cable and rear brake cable.





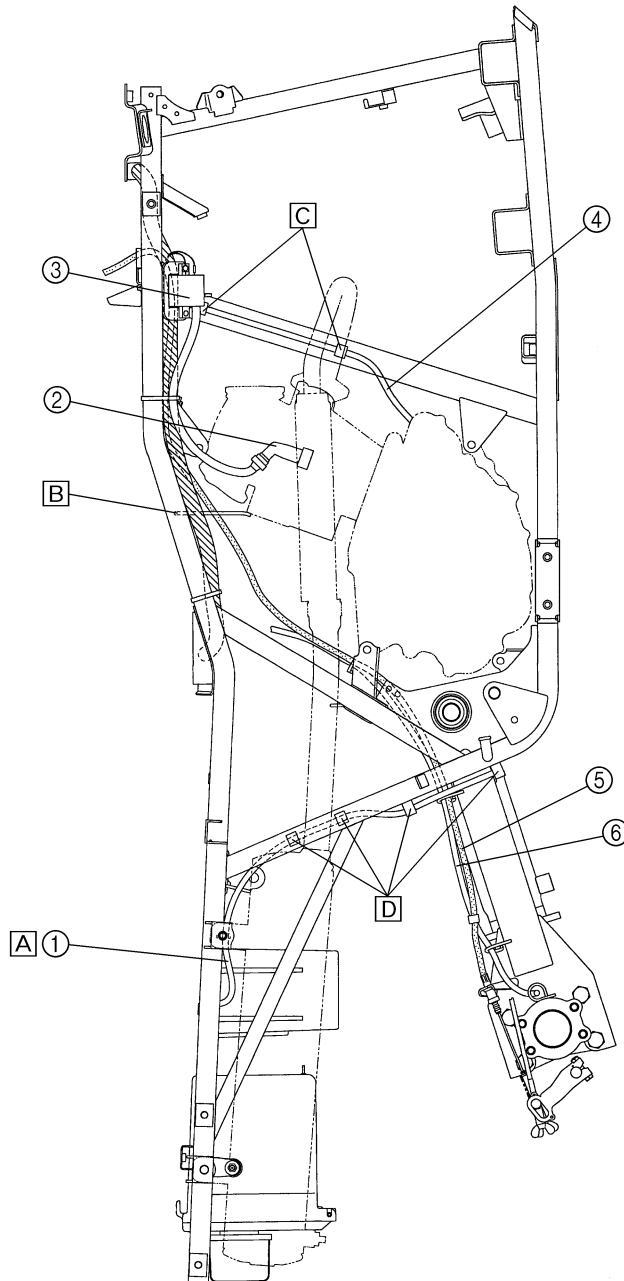
- L** Fasten the starter motor lead and wire harness to the frame with the plastic clamp.
- M** Route the rear brake cable and rear brake breather hose through the cable guide.
- N** Fasten the rear brake cable and rear brake breather hose to the swingarm with the plastic clips.
- O** Route the rear brake breather hose through the cable guide.
- P** Route the final gear case breather hose through the cable guide.
- Q** 10 mm (0.4 in)
- R** 40 ~ 50 mm (1.6 ~ 2.0 in)
- S** 100 mm (4.0 in)





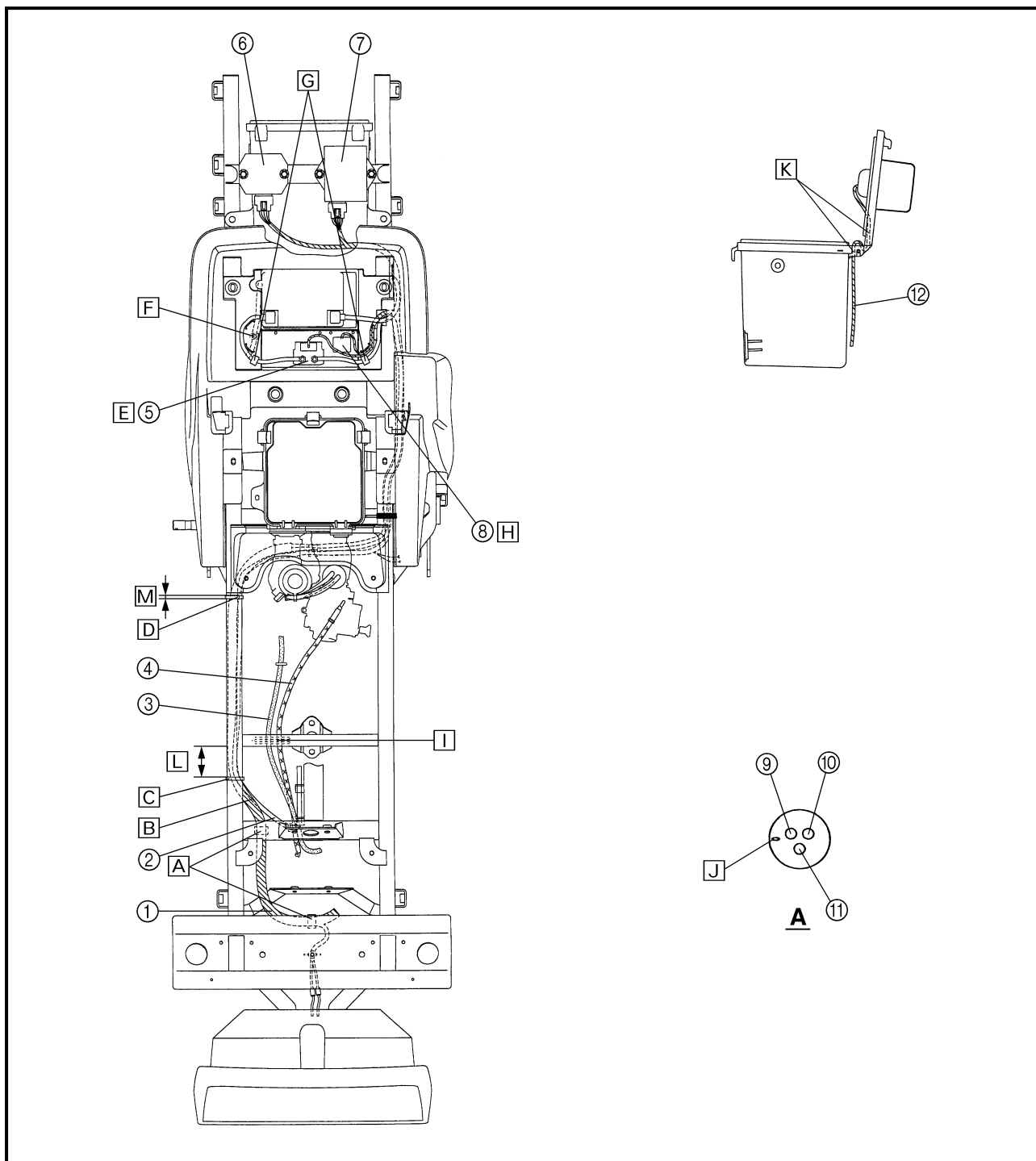
- ① Battery breather hose
- ② Spark plug cap
- ③ Ignition coil
- ④ Starter motor lead
- ⑤ Rear brake cable
- ⑥ Rear brake breather hose

- A Make sure that the battery breather hose is not kinked or bent.
- B Route the rear brake cable through the cable guide on the cylinder.
- C Fasten the starter motor lead to the frame with the plastic clamps.
- D Fasten the battery breather hose to the frame with the plastic clamps.
- E 50 ~ 60 mm (2.0 ~ 2.4 in)





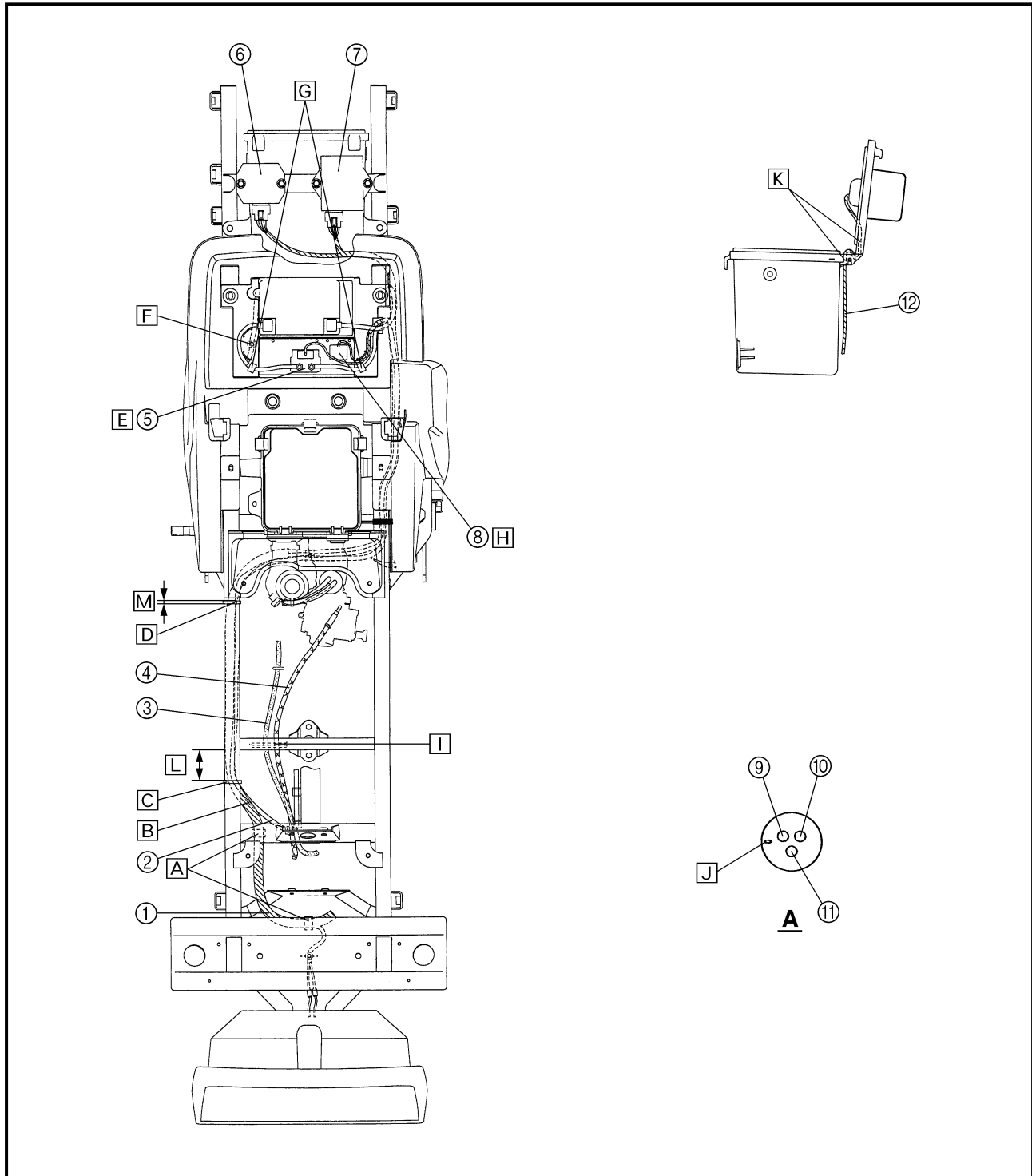
- |                                  |  |
|----------------------------------|--|
| ① Wire harness                   | A Fasten the wire harness to the frame with the plastic clamps.  |
| ② Starter motor lead             | B Make sure the starter motor lead and wire harness do not contact the ignition coil.                            |
| ③ Rear brake cable               | C Fasten the wire harness, starter motor lead, and ignition coil lead to the frame with the plastic locking tie. |
| ④ Throttle cable                 | D Fasten the wire harness and starter motor lead to the frame with the plastic locking tie.                      |
| ⑤ Starter relay                  | E Install the starter relay onto the tabs with its terminal side facing up.                                      |
| ⑥ Rectifier/regulator            |  |
| ⑦ CDI unit                       |  |
| ⑧ Starting circuit cut-off relay |  |
| ⑨ Rear brake breather hose       |  |
| ⑩ Carburetor air vent hose       |  |
| ⑪ Final gear case breather hose  |  |
| ⑫ Taillight lead                 |  |





- [F] Fasten the battery breather hose to the rear fender with the plastic clamp and then insert the clamp into the hole in the rear fender.
- [G] Fasten the battery ⊕ lead and starter motor lead to the rear fender with the plastic clamps.
- [H] Install the starter circuit cut-off relay onto the tab with its terminal side facing down.
- [I] Route the throttle cable and rear brake cable through the cable guide. Make sure that the throttle cable is routed to the inside of the rear brake cable.

- [J] Make sure that the grommet is installed with the mark facing forward.
- [K] Route the taillight lead through the lead holders on the lid and the bottom of the box.
- [L] 50 mm (2.0 in)
- [M] 5 mm (0.2 in)





## PERIODIC INSPECTIONS AND ADJUSTMENTS

### INTRODUCTION

This chapter includes all information necessary to perform recommended inspections and adjustments. These preventive maintenance procedures, if followed, will ensure more reliable machine operation and a longer service life. In addition, the need for costly overhaul work will be greatly reduced. This information applies to machines already in service as well as new machines that are being prepared for sale. All service technicians should be familiar with this entire chapter.

### PERIODIC MAINTENANCE/LUBRICATION

ITEM	ROUTINE	INITIAL			EVERY	
		1 month	3 months	6 months	6 months	1 year
Valves*	<ul style="list-style-type: none"> <li>• Check valve clearance.</li> <li>• Adjust if necessary.</li> </ul>	○		○	○	○
Spark plug	<ul style="list-style-type: none"> <li>• Check condition.</li> <li>• Adjust gap and clean.</li> <li>• Replace if necessary.</li> </ul>	○	○	○	○	○
Air filter	<ul style="list-style-type: none"> <li>• Clean.</li> <li>• Replace if necessary.</li> </ul>	Every 20 ~ 40 hours (more often in wet or dusty areas.)				
Carburetor*	<ul style="list-style-type: none"> <li>• Check idle speed/starter operation.</li> <li>• Adjust if necessary.</li> </ul>		○	○	○	○
Cylinder head breather system*	<ul style="list-style-type: none"> <li>• Check breather hose for cracks or damage.</li> <li>• Replace if necessary.</li> </ul>			○	○	○
Exhaust system*	<ul style="list-style-type: none"> <li>• Check for leakage.</li> <li>• Retighten if necessary.</li> <li>• Replace gasket if necessary.</li> </ul>			○	○	○
Spark arrester	<ul style="list-style-type: none"> <li>• Clean.</li> </ul>			○	○	○
Fuel line*	<ul style="list-style-type: none"> <li>• Check fuel hose for cracks or damage.</li> <li>• Replace if necessary.</li> </ul>			○	○	○
Engine oil	<ul style="list-style-type: none"> <li>• Replace (Warm engine before draining).</li> </ul>	○		○	○	○
Engine oil filter	<ul style="list-style-type: none"> <li>• Clean.</li> </ul>	○		○		○
Engine oil strainer	<ul style="list-style-type: none"> <li>• Clean.</li> </ul>	○		○		○
Final gear oil	<ul style="list-style-type: none"> <li>• Check oil level/oil leakage.</li> <li>• Replace.</li> </ul>	○				○
Brakes*	<ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Adjust if necessary.</li> </ul>	○	○	○	○	○
Clutch*	<ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Adjust if necessary.</li> </ul>	○		○	○	○
Wheels*	<ul style="list-style-type: none"> <li>• Check balance/damage/runout.</li> <li>• Replace if necessary.</li> </ul>	○		○	○	○
Wheel bearings*	<ul style="list-style-type: none"> <li>• Check bearing assembly for looseness/damage.</li> <li>• Replace if damaged.</li> </ul>	○		○	○	○
Front and rear suspension*	<ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Correct if necessary.</li> </ul>			○		○
Steering system*	<ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Correct if necessary.</li> <li>• Check toe-in.</li> <li>• Adjust if necessary.</li> </ul>	○	○	○	○	○

# PERIODIC MAINTENANCE/LUBRICATION



ITEM	ROUTINE	INITIAL			EVERY	
		1 month	3 months	6 months	6 months	1 year
Steering shaft*	• Lubricate every 6 months.**			○	○	○
Fittings and Fasteners*	• Check all chassis fittings and fasteners. • Correct if necessary.	○	○	○	○	○
Battery*	• Check specific gravity. • Check that the breather hose is working properly. • Correct if necessary.	○	○	○	○	○

\*: It is recommended that these items be serviced by a Yamaha dealer.

\*\*: Lithium soap base grease.

## WARNING

**Indicates a potential hazard that could result in serious injury or death.**

## ENGINE

### SPARK ARRESTER CLEANING

1.Clean:

- Spark arrester

\*\*\*\*\*

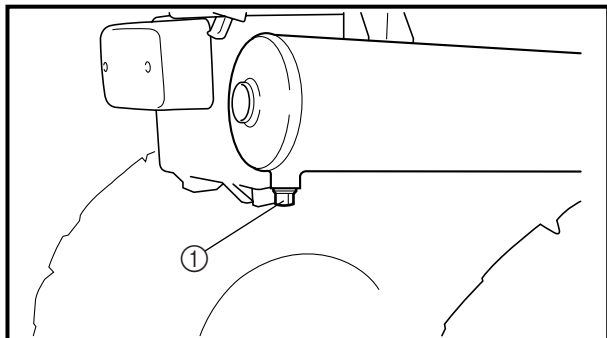
### Cleaning steps:

#### **⚠ WARNING**

- Select a well-ventilated area free of combustible materials.
- Always let the exhaust system cool before performing this operation.

- Remove the purging bolt ①.
- Start the engine and rev it up approximately twenty times while momentarily creating exhaust system back pressure by blocking the end of the muffler with a shop towel.
- Stop the engine and allow the exhaust pipe to cool.
- Install the purging bolt ① and tighten it.

\*\*\*\*\*





## CHASSIS

### FRONT BRAKE FLUID LEVEL INSPECTION

1. Place the machine on a level surface.

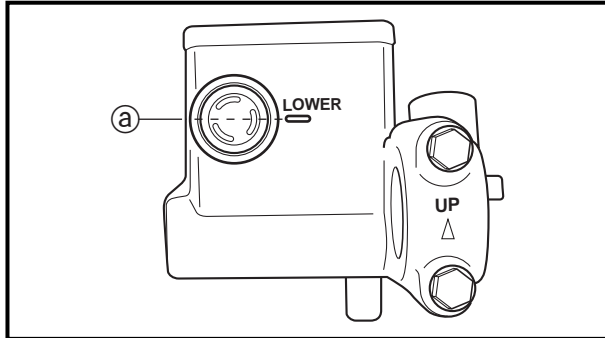
**NOTE:**

When inspecting the front brake fluid level, make sure that the top of the master cylinder top is horizontal.

2. Inspect:

- Brake fluid level

Fluid level is under "LOWER" level line ①  
→ Fill up.



**Recommended brake fluid:**  
**DOT 4**

**NOTE:**

If DOT 4 is not available, DOT 3 can be used.

**CAUTION:**

Brake fluid may erode painted surfaces or plastic parts. Always clean up spilled fluid immediately.

**⚠ WARNING**

- Use only the recommended brake fluid; otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid; mixing fluids may result in a harmful chemical reaction and lead to poor performance.
- Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the fluid and may result in a vapor lock.

### FRONT BRAKE PAD INSPECTION

1. Remove:

- Front wheel

2. Inspect:

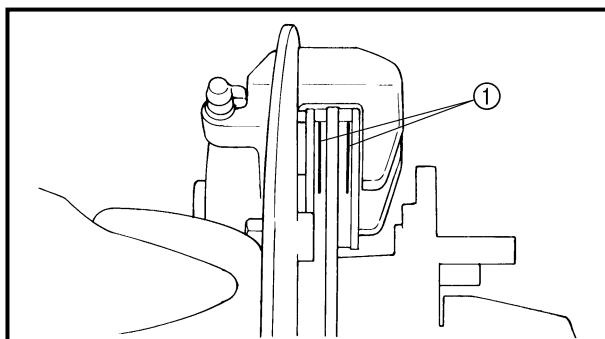
- Brake pad

Wear indicators ① almost touch the brake disc → Replace the brake pads as a set.  
Refer to "FRONT BRAKE".

3. Operate the brake lever.

4. Install:

- Front wheel

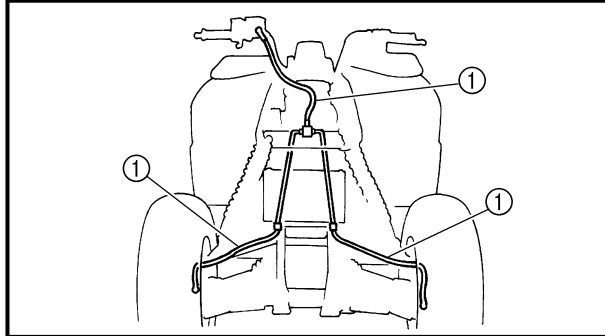


### BRAKE HOSE INSPECTION

1.Remove:

- Front carrier
- Front fender

Refer to “FENDER AND FUEL TANK”.



2.Inspect:

- Brake hoses ①  
Cracks/wear/damage → Replace.

3.Check:

- Brake hose clamp  
Loosen → Tighten.

4.Hold the machine in an upright position and apply the front or rear brake.

5.Check:

- Brake hoses  
Active the brake lever several times.  
Fluid leakage → Replace the hose.  
Refer to “FRONT BRAKE”.

6.Install:

- Front fender
- Front carrier

Refer to “FENDER AND FUEL TANK”.

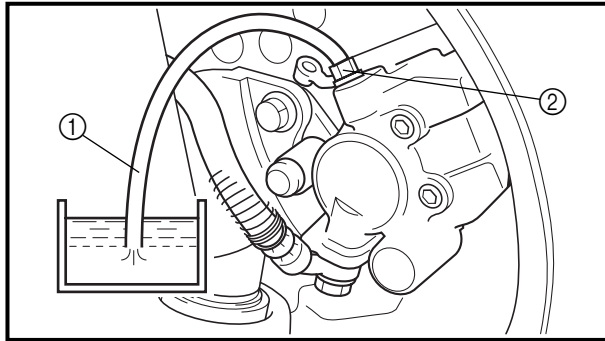
### AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)

#### **WARNING**

Bleed the brake system if:

- The system has been disassembled.
- A brake hose or brake pipe have been loosened or removed.
- The brake fluid has been very low.
- The brake operation has been faulty.

A loss of braking performance may occur if the brake system is not properly bled.



## 1.Bleed:

- Brake system

\*\*\*\*\*

### Air bleeding steps:

- Add the proper brake fluid to the reservoir.
- Install the diaphragm. Be careful not to spill any fluid or allow the reservoir to overflow.
- Connect the clear plastic hose ① tightly to the caliper bleed screw ②.
- Place the other end of the hose into a container.
- Slowly apply the brake lever several times.
- Pull the lever in and hold it.
- Loosen the bleed screw and allow the lever to travel towards its limit.
- Tighten the bleed screw when the lever limit has been reached, then release the lever.
- Repeat steps (e) to (h) until all the air bubbles have disappeared from the fluid.
- Tighten the bleed screw.



**Caliper bleed screw:**  
**6 Nm (0.6 m • kg, 4.3 ft • lb)**

### NOTE:

If bleeding is difficult, it may be necessary to let the brake fluid settle for a few hours. Repeat the bleeding procedure when the tiny bubbles in the system have disappeared.

- Add brake fluid to the proper level.  
Refer to "FRONT BRAKE FLUID LEVEL INSPECTION".

### ⚠ WARNING

**Check the operation of the brake after bleeding the brake system.**

\*\*\*\*\*



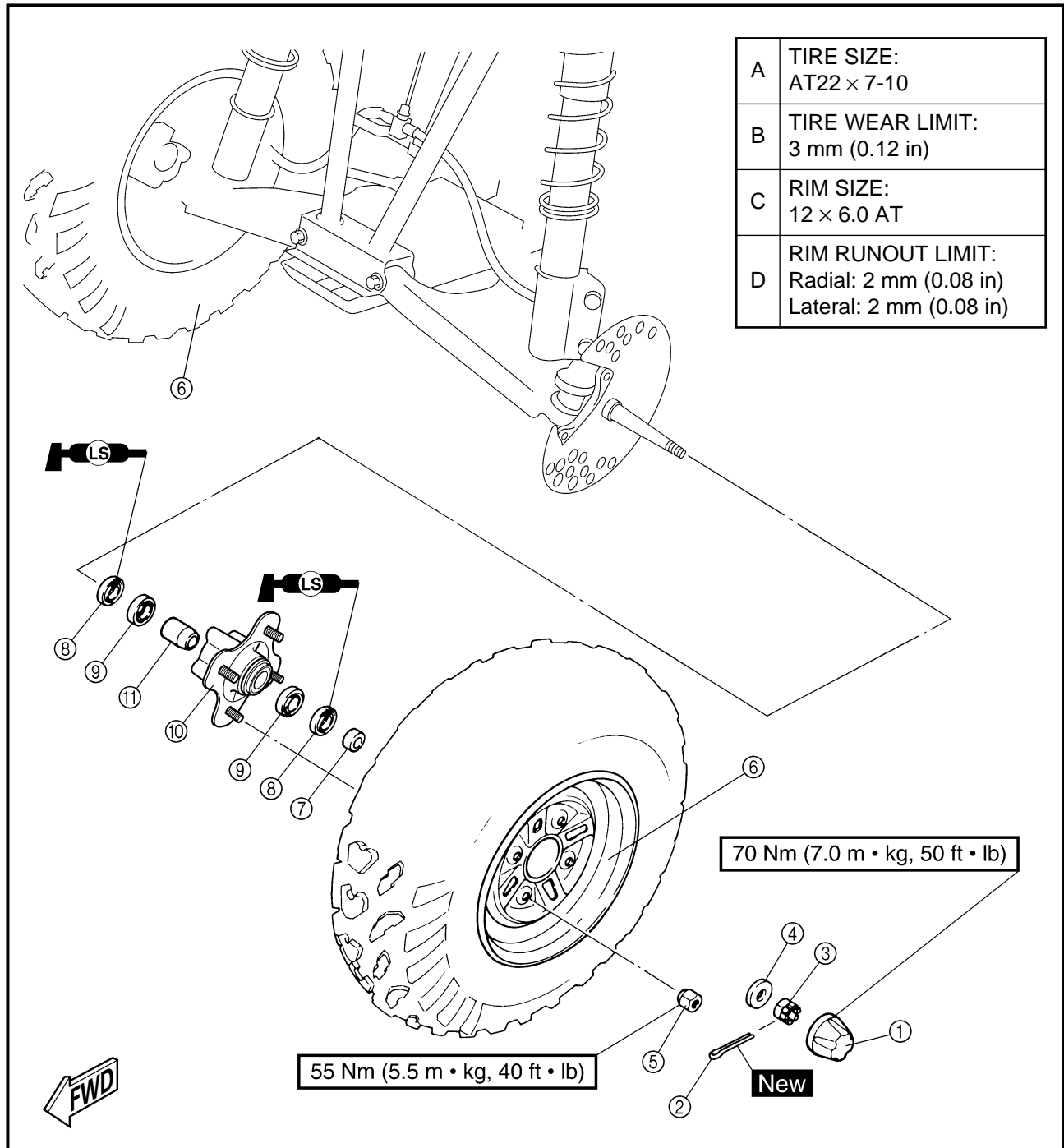
## CHASSIS

## FRONT WHEEL

- ① Wheel cap
- ② Cotter pin
- ③ Axle nut
- ④ Plain washer
- ⑤ Wheel nut
- ⑥ Front wheel
- ⑦ Spacer
- ⑧ Oil seal
- ⑨ Bearing
- ⑩ Front wheel hub
- ⑪ Bearing spacer

## TIRE AIR PRESSURE

Cold Tire Pressure	Front	Rear
Standard	20 kPa (0.20 kg/cm <sup>2</sup> , 2.9 psi)	25 kPa (0.25 kg/cm <sup>2</sup> , 3.6 psi)
Minimum	17 kPa (0.17 kg/cm <sup>2</sup> , 2.5 psi)	22 kPa (0.22 kg/cm <sup>2</sup> , 3.2 psi)
Maximum	23 kPa (0.23 kg/cm <sup>2</sup> , 3.3 psi)	28 kPa (0.28 kg/cm <sup>2</sup> , 4.0 psi)



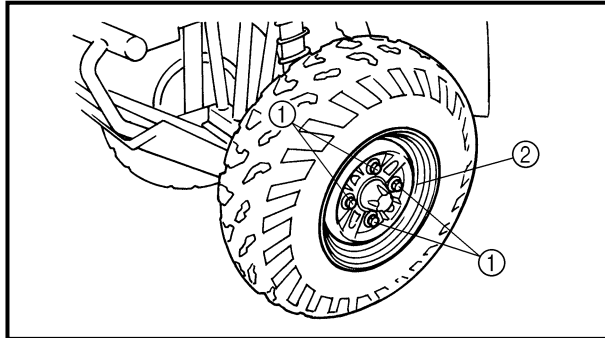


### REMOVAL

1. Place the machine on a level surface.

2. Loosen:

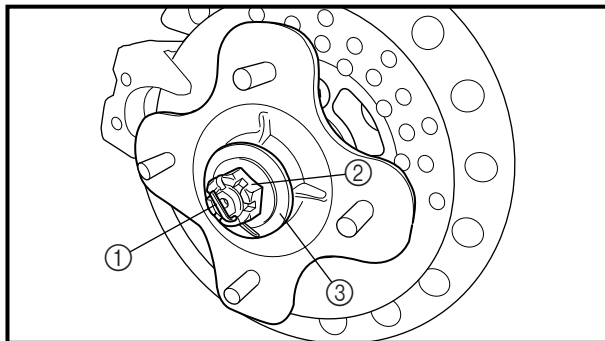
- Nuts (front wheel)  
Apply the front brake.



3. Block the rear wheels, and elevate the front wheels by placing the suitable stand under the frame.

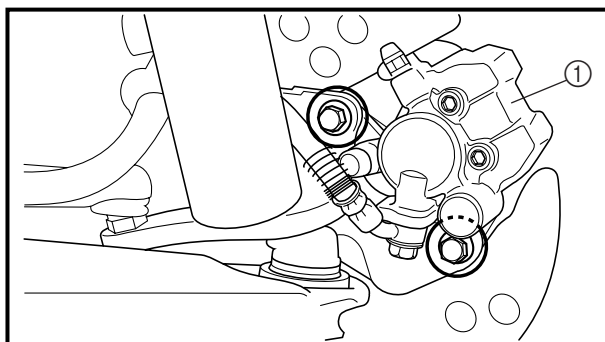
4. Remove:

- Nuts ① (front wheel)
- Front wheel ②



5. Remove:

- Wheel cap
- Cotter pin ①
- Axle nut ②
- Plain washer ③

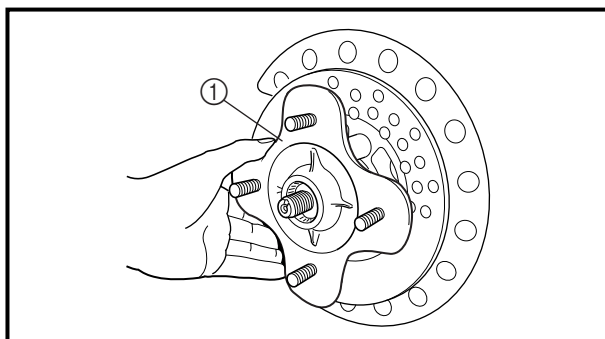


6. Remove:

- Front brake caliper ①

### NOTE:

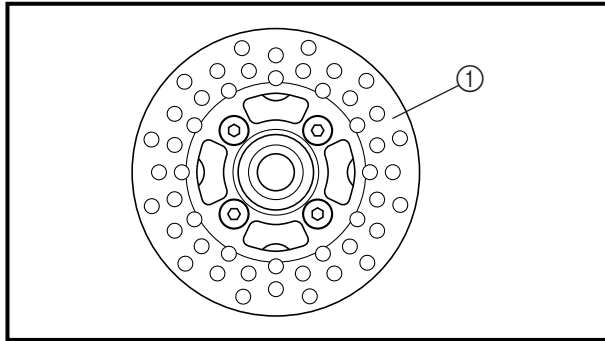
Do not depress the brake lever when the wheel is off the machine otherwise the brake pads will be forced shut.



7. Remove:

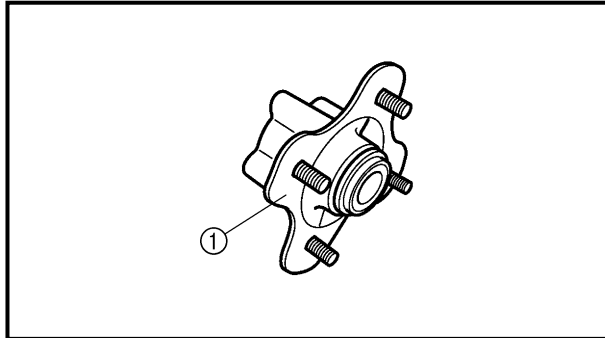
- Front wheel hub ①  
(with brake disc)





8.Remove:

- Front brake disc ①



### INSPECTION

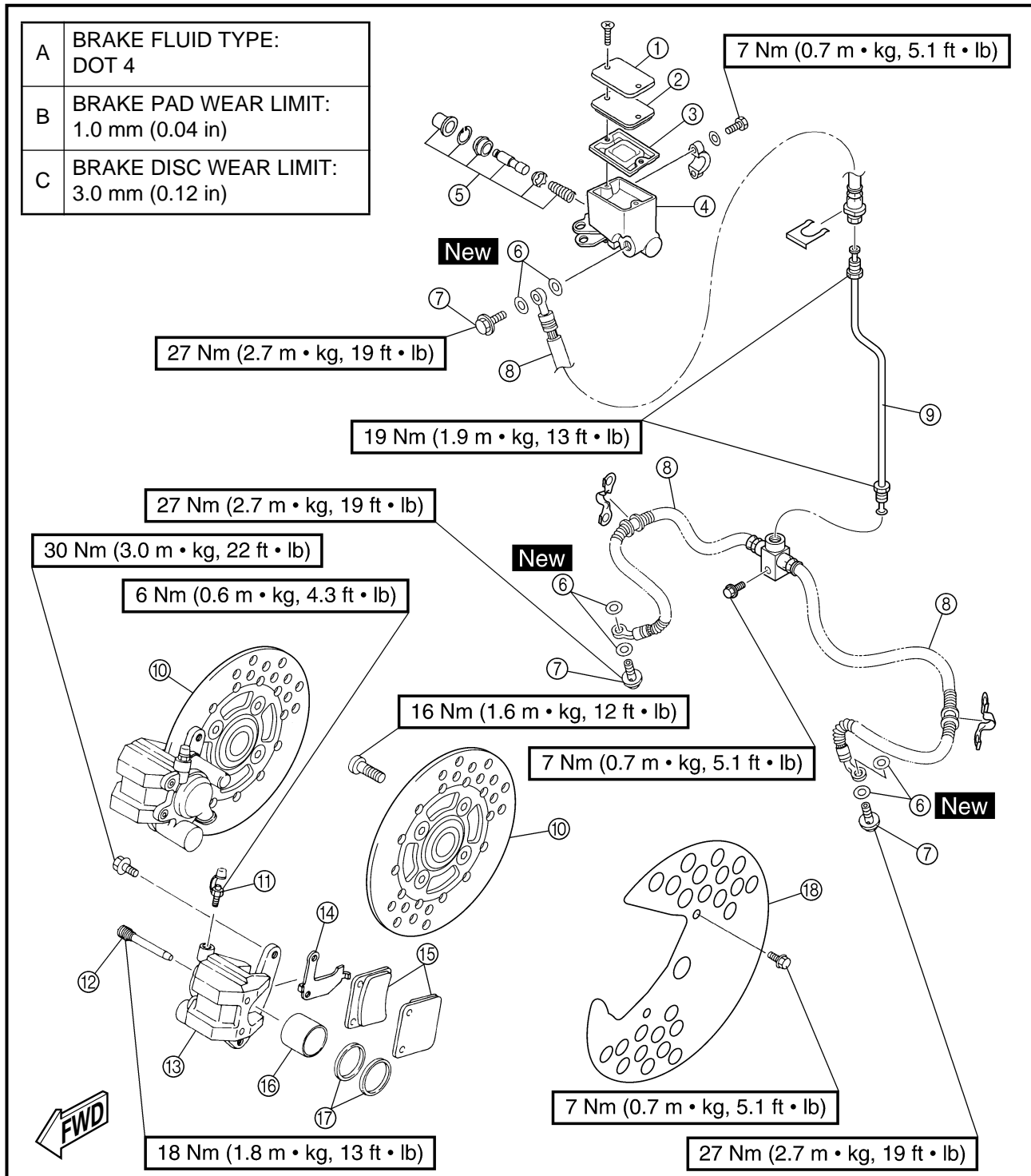
1.Inspect:

- Wheel hub ①  
Cracks/damage → Replace.



## FRONT BRAKE

- |  |                       |
|--|-----------------------|
| ① Brake master cylinder reservoir cap              | ⑩ Brake disc          |
| ② Brake master cylinder reservoir diaphragm holder | ⑪ Caliper bleed screw |
| ③ Brake master cylinder reservoir diaphragm        | ⑫ Retaining bolt      |
| ④ Brake master cylinder                            | ⑬ Brake caliper       |
| ⑤ Brake master cylinder kit                        | ⑭ Pad shim            |
| ⑥ Copper washer                                    | ⑮ Brake pad           |
| ⑦ Union bolt                                       | ⑯ Piston              |
| ⑧ Brake hose                                       | ⑰ Piston seal         |
| ⑨ Brake pipe                                       | ⑱ Brake disc guard    |



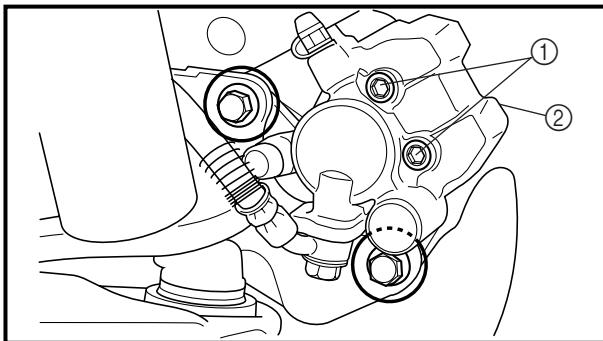
**CAUTION:**

Disc brake components rarely require disassembly. DO NOT:

- Disassemble components unless absolutely necessary.
- Use solvents on internal brake components.
- Use contaminated brake fluid for cleaning. Use only clean brake fluid.
- Allow brake fluid to come in contact with the eyes, otherwise eye injury may occur.
- Allow brake fluid to contact painted surfaces or plastic parts otherwise damage may occur.
- Disconnect any hydraulic connection otherwise the entire system must be disassembled, drained, cleaned, and then properly filled and bled after reassembly.

**BRAKE PAD REPLACEMENT****NOTE:**

It is not necessary to disassemble the brake caliper and brake hose to replace the brake pads.



1.Remove:

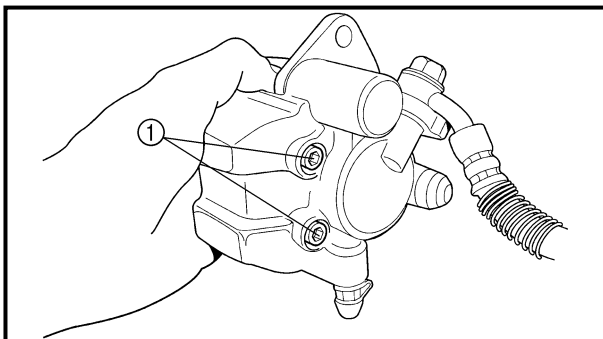
- Front wheel

2.Loosen:

- Retaining bolts ①

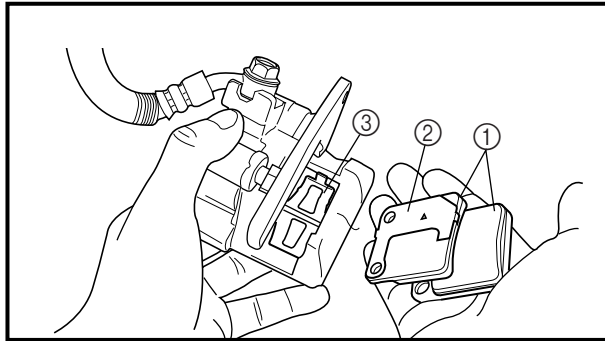
3.Remove:

- Front brake caliper ②



4.Remove:

- Retaining bolts ①



5.Remove:

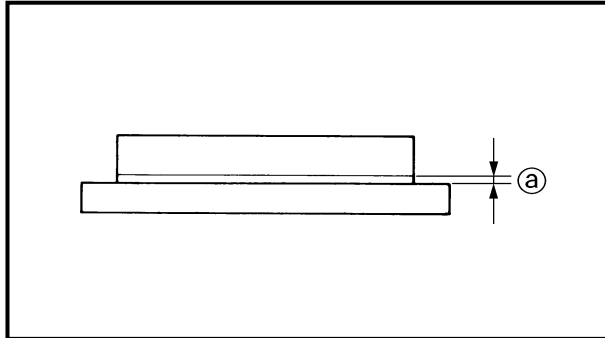
- Brake pads ①
- (with pad shim ②)
- Pad spring ③

## NOTE:

- When pad replacement is required, also replace the pad spring and shim.
- Replace the pads as a set if either is found to be worn to the wear limit ④.

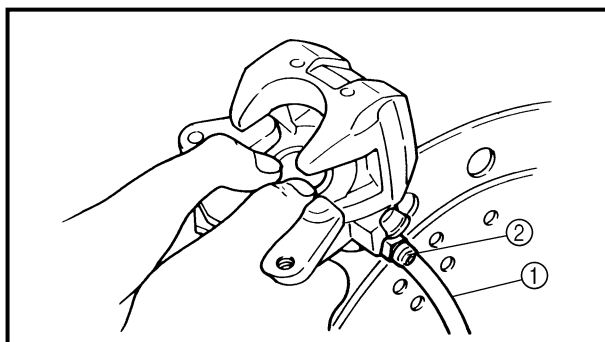


**Wear limit ④:**  
**1.0 mm (0.04 in)**



6.Install:

- Pad shim
- (onto inside brake pad)
- Pad spring
- Brake pads



## Installation steps:

- Connect a suitable hose ① tightly to the caliper bleed screw ②. Then, place the other end of this hose into an open container.
- Loosen the caliper bleed screw and push the pistons into the caliper with the finger.
- Tighten the caliper bleed screw ②.



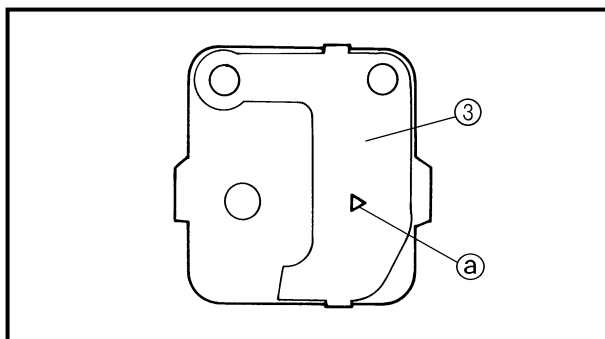
**Caliper bleed screw:**  
**6 Nm (0.6 m • kg, 4.3 ft • lb)**

- Install the pad shim ③ (new) onto the brake pad (new).

## NOTE:

The arrow mark ④ on the pad shim must point in the direction of the disc rotation.

- Install the pad spring (new) and brake pads (new).





## 7.Install:

- Retaining bolts
- Front brake caliper



### Retaining bolt:

**18 Nm (1.8 m • kg, 13 ft • lb)**

### Bolt (front brake caliper):

**30 Nm (3.0 m • kg, 22 ft • lb)**

## 8.Install:

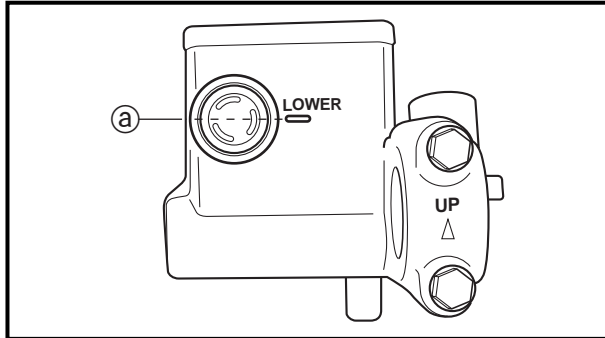
- Front wheel

## 9.Inspect:

- Brake fluid level

Refer to “FRONT BRAKE FLUID LEVEL INSPECTION”.

- ① “LOWER” level line



## 10.Check:

- Brake lever operation

A soft or spongy feeling → Bleed brake system.

Refer to “AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)”.

## CALIPER DISASSEMBLY

### NOTE:

Before disassembling the front brake caliper, drain the brake hose, master cylinder, brake caliper and reservoir tank of their brake fluid.

## 1.Remove:

- Front wheel

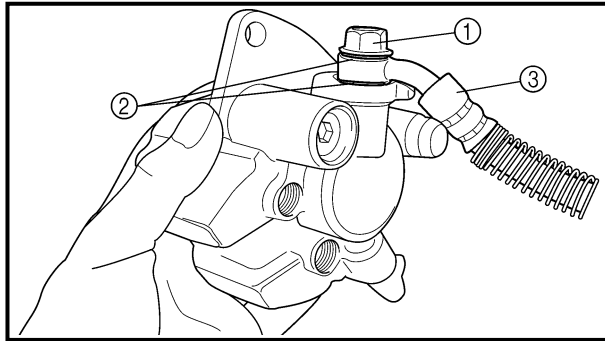
## 2.Loosen:

- Union bolt
- Retaining bolts
- Retaining bolt (caliper bracket)

## 3.Remove:

- Front brake caliper
- Retaining bolts
- Brake pads  
(with pad shim)
- Pad spring

Refer to “BRAKE PAD REPLACEMENT”.

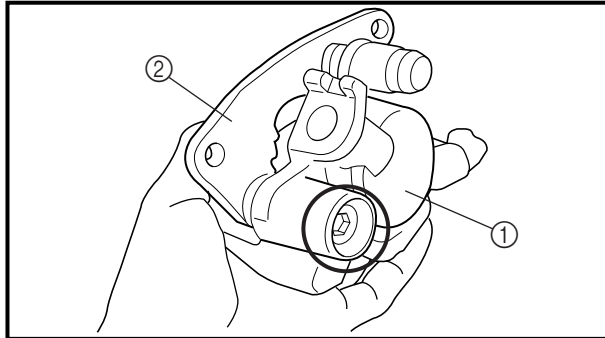


4.Remove:

- Union bolt ①
- Copper washers ②
- Brake hose ③

**NOTE:**

Place the open end of the hose into a container and pump the oil fluid out carefully.

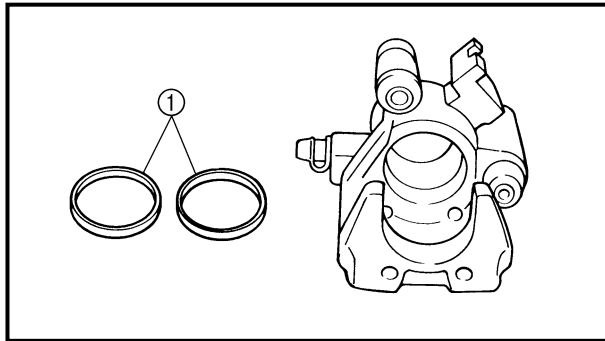


5.Remove:

- Caliper body ①
- Caliper bracket ②

**NOTE:**

Before removing the caliper body from the bracket, disconnect the dust boot from the guide shaft on the bracket.



6.Remove:

- Piston
- Piston seals ①

\*\*\*\*\*

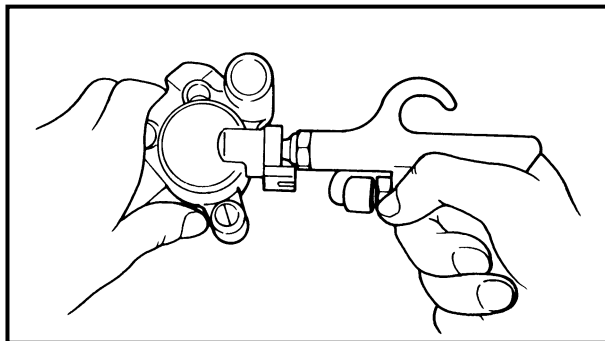
**Removal steps:**

- Blow compressed air into the hose joint opening to force out the caliper piston from the caliper body.
- Remove the piston seals.

**⚠ WARNING**

**Never try to pry out the piston.**

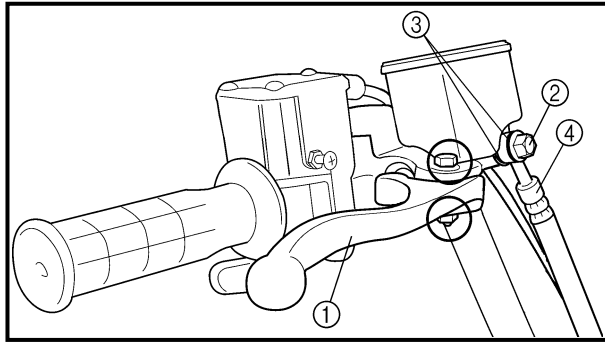
\*\*\*\*\*



## MASTER CYLINDER DISASSEMBLY

**NOTE:**

Before disassembling the front brake master cylinder, drain the brake hose, master cylinder, brake caliper and reservoir tank of their brake fluid.

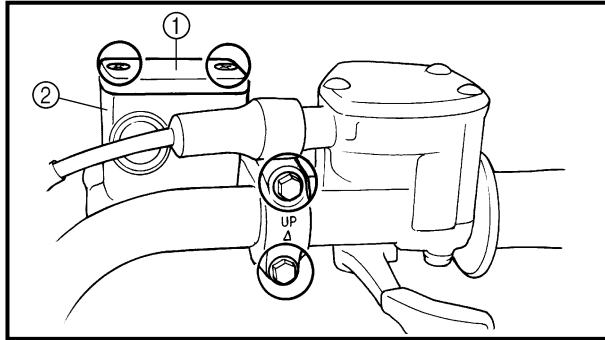


1.Remove:

- Brake lever ①
- Union bolt ②
- Copper washers ③
- Brake hose ④

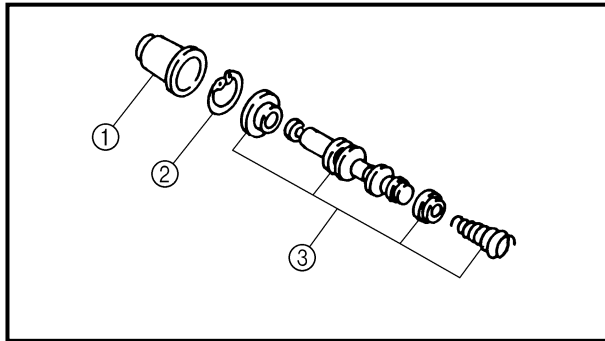
## NOTE:

Hold a container under the master cylinder and under the hose end to collect remaining brake fluid.



2.Remove:

- Brake master cylinder reservoir cap ①
- Brake master cylinder reservoir diaphragm holder
- Brake master cylinder reservoir diaphragm
- Brake master cylinder ②



3.Remove:

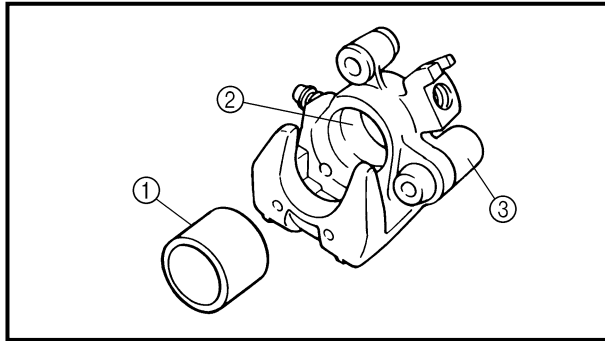
- Dust boot ①
  - Circlip ②
  - Brake master cylinder kit ③
- Drain the excess fluid.

## INSPECTION AND REPAIR

Recommended brake component replacement schedule:	
Brake pads	As required
Piston seal	Every two years
Brake hoses	Every two years
Brake fluid	Replace only when brakes are disassembled.

## ⚠ WARNING

All internal parts should be cleaned in new brake fluid only. Do not use solvents as they will cause seals to swell and distort.

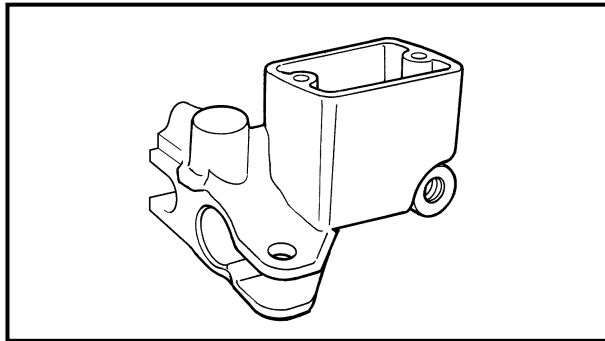


## 1. Inspect:

- Caliper piston ①  
Scratches/rust/wear → Replace caliper assembly.
- Caliper cylinder ②  
Wear/scratches → Replace caliper assembly.
- Caliper body ③  
Cracks/damage → Replace.
- Oil delivery passage (caliper body)  
Blow out with compressed air.

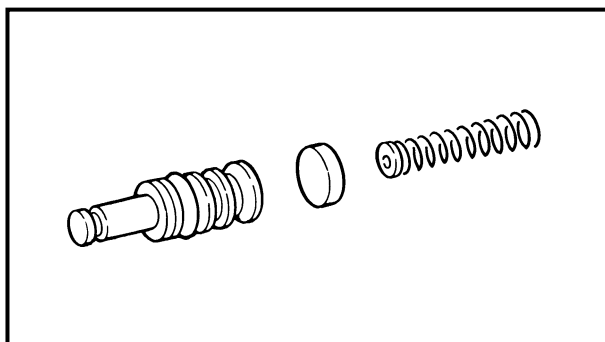
## ⚠ WARNING

**Replace the piston seal whenever the caliper is disassembled.**



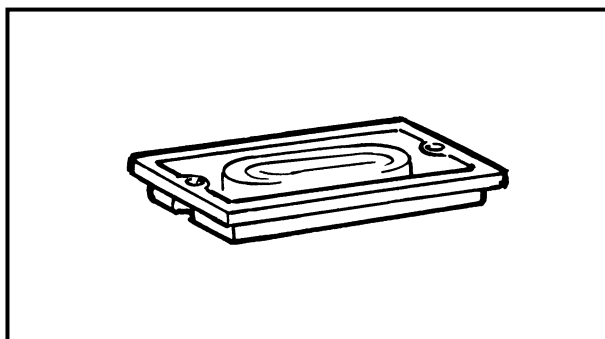
## 2. Inspect:

- Brake master cylinder  
Wear/scratches → Replace the brake master cylinder assembly.
- Brake master cylinder body  
Cracks/damage → Replace.
- Oil delivery passage (master cylinder body)  
Blow out with compressed air.



## 3. Inspect:

- Brake master cylinder kit  
Scratches/wear/damage → Replace as a set.



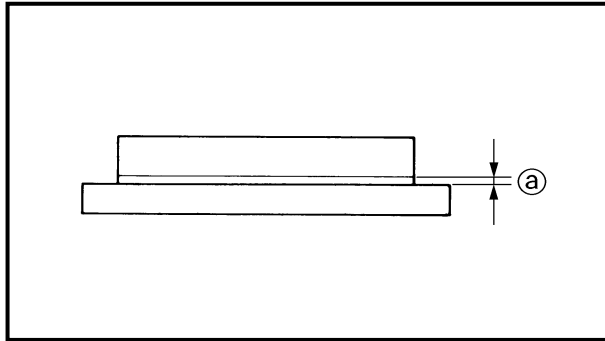
## 4. Inspect:

- Brake master cylinder reservoir diaphragm  
Wear/damage → Replace.

## 5. Inspect:

- Brake hose  
Cracks/wear/damage → Replace.





### 6.Measure:

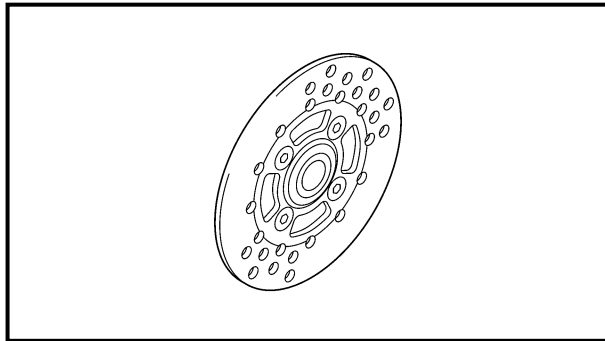
- Brake pads (thickness) ①  
Out of specification → Replace.

### NOTE:

- When pad replacement is required, also replace the pad spring and shims.
- Replace the pads as a set if either is found to be worn to the wear limit ①.

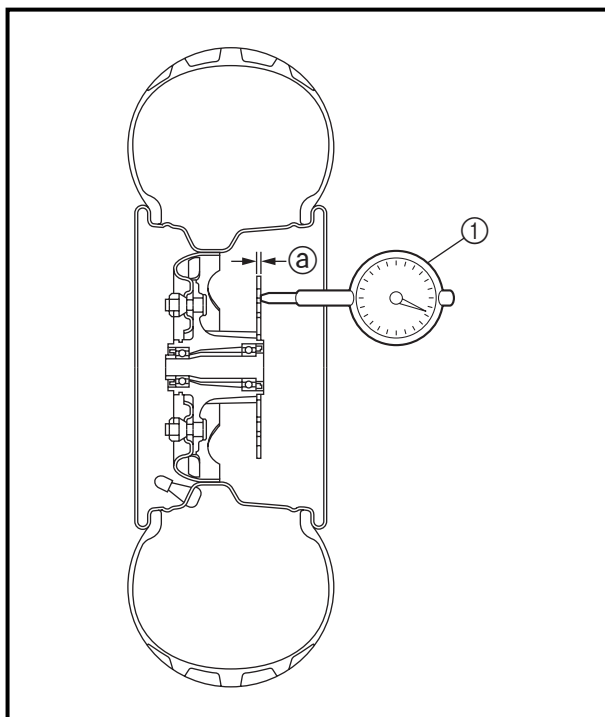


**Wear limit ①:**  
**1.0 mm (0.04 in)**



### 7.Inspect:

- Brake disc  
Galling/damage → Replace.



### 8.Measure:

- Brake disc deflection  
Out of specification → Inspect wheel runout.  
If wheel runout is in good condition, replace the brake disc(s).



**Maximum deflection:**  
**0.15 mm (0.006 in)**

- Brake disc thickness ①  
Out of specification → Replace.



**Minimum thickness:**  
**3.0 mm (0.12 in)**

① Dial gauge



## NOTE:

Tighten the bolts (brake disc) in stage using a crisscross pattern.



**Bolt (brake disc):**  
16 Nm (1.6 m • kg, 12 ft • lb)

## CALIPER ASSEMBLY

### ⚠ WARNING

- All internal parts should be cleaned in new brake fluid only.
- Internal parts should be lubricated with brake fluid when installed.



**Recommended brake fluid:**  
DOT 4

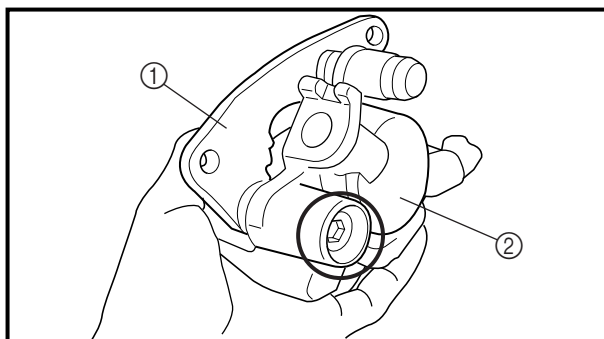
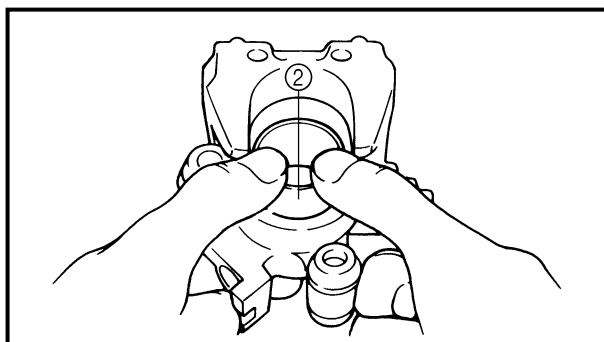
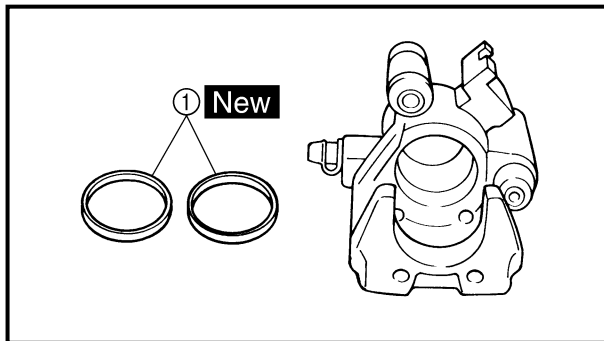
- Replace the piston seals whenever a caliper is disassembled.

### 1. Install:

- Piston seals ① **New**
- Piston ②

### ⚠ WARNING

Always use new piston seals.

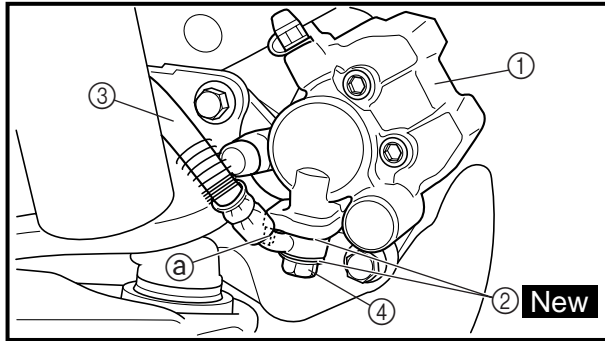


### 2. Install:

- Caliper bracket ①
- Caliper body ②

## NOTE:

Apply the lithium soap base grease onto the caliper guide shaft and retaining bolt.



## 3.Install:

- Brake caliper ① (temporarily)
- Copper washers ② **New**
- Brake hose ③
- Union bolt ④



**Union bolt:**  
27 Nm (2.7 m • kg, 19 ft • lb)

**CAUTION:**

When installing the brake hose on the caliper, make sure that the brake pipe touches the projection ① on the brake caliper.

**⚠ WARNING**

- Proper hose routing is essential to insure safe machine operation. Refer to “CABLE ROUTING”.
- Always use new copper washers.

## 4.Remove:

- Brake caliper

## 5.Install:

- Pad spring
  - Brake pads (with pad shim)
  - Retaining bolts
  - Front brake caliper
- Refer to “BRAKE PAD REPLACEMENT”.



**Retaining bolt (caliper bracket):**  
23 Nm (2.3 m • kg, 17 ft • lb)  
**Retaining bolt:**  
18 Nm (1.8 m • kg, 13 ft • lb)  
**Bolt (brake caliper):**  
30 Nm (3.0 m • kg, 22 ft • lb)



## 6.Fill:

- Reservoir tank



**Recommended brake fluid:  
DOT 4**

**NOTE:**

If DOT 4 is not available, 3 can be used.

**CAUTION:**

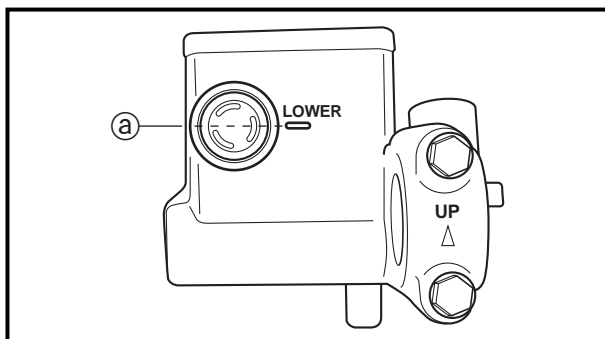
**Brake fluid may erode painted surfaces or plastic parts. Always clean up spilled fluid immediately.**

**⚠ WARNING**

- Use only the designated quality brake fluid: otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.
- Refill with the same type of brake fluid: mixing fluids may result in a harmful chemical reaction and lead to poor performance.
- Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the fluid and may result in vapor lock.

## 7.Air bleed:

- Brake system  
Refer to “AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)”.



## 8.Inspect:

- Brake fluid level  
Fluid level is under “LOWER” level line → Replenish.  
Refer to “FRONT BRAKE FLUID LEVEL INSPECTION”.

① “LOWER” level line



## MASTER CYLINDER ASSEMBLY

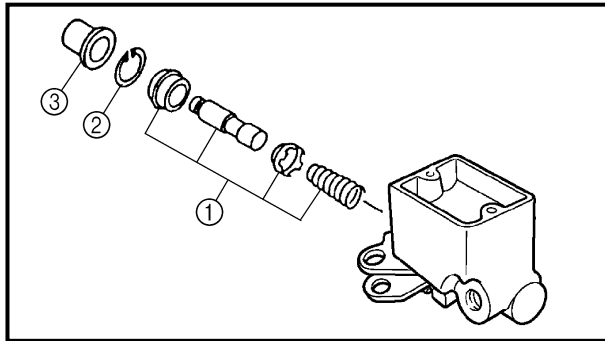
**⚠ WARNING**

- All internal parts should be cleaned in new brake fluid only.
- Internal parts should be lubricated with brake fluid when installed.



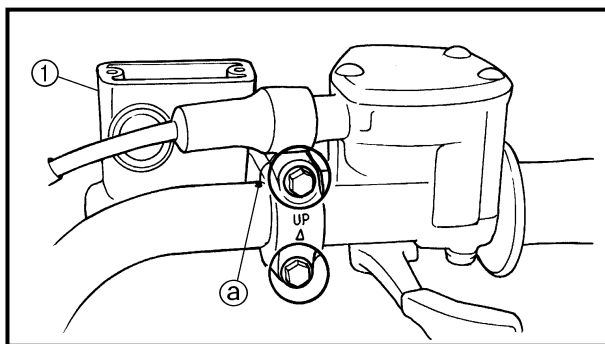
Recommended brake fluid:  
DOT 4

- Replace the piston seals and dust seals whenever a brake master cylinder is disassembled.



## 1.Install:

- Brake master cylinder kit ①
- Circlip ②
- Dust boot ③



## 2.Install:

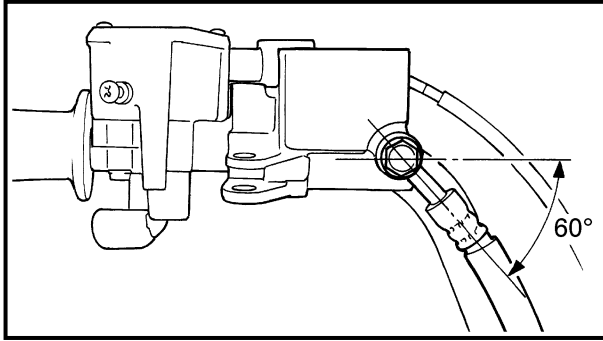
- Brake master cylinder ①

**CAUTION:**

- Install the brake master cylinder holder with the “UP” mark facing upward.
- Align the end of the brake master cylinder holder with the punch mark (a) in the handlebar.
- Tighten first the upper bolt, then the lower bolt.



Bolt (brake master cylinder holder):  
7 Nm (0.7 m • kg, 5.1 ft • lb)



## 3.Install:

- Copper washers
- Brake hose
- Union bolt



**Union bolt:**  
**27 Nm (2.7 m • kg, 19 ft • lb)**

**NOTE:**

- Tighten the union bolt while holding the brake hose as shown.
- Check that the brake hose does not touch other parts (throttle cable, wire harness, leads, etc.) by turning the handlebar left and right, and correct if necessary.

**⚠ WARNING**

- Proper hose routing is essential to insure safe machine operation. Refer to “CABLE ROUTING”.
- Always use new copper washers.

## 4.Install:

- Brake lever

## 5.Fill:

- Brake master cylinder reservoir



**Recommended brake fluid:**  
**DOT 4**

**NOTE:**

If DOT 4 is not available, 3 can be used.

**CAUTION:**

Brake fluid may erode painted surfaces or plastic parts. Always clean up spilled fluid immediately.

**⚠ WARNING**

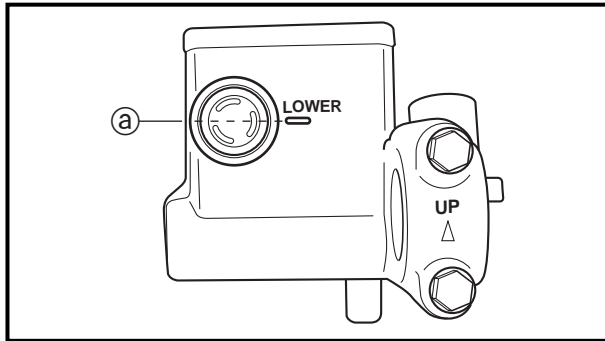
- Use only the designated quality brake fluid: otherwise, the rubber seals may deteriorate, causing leakage and poor brake performance.



- Refill with the same type of brake fluid: mixing fluids may result in a harmful chemical reaction and lead to poor performance.
- Be careful that water does not enter the master cylinder when refilling. Water will significantly lower the boiling point of the fluid and may result in vapor lock.

6. Air bleed:

- Brake system  
Refer to “AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)”.



7. Inspect:

- Brake fluid level  
Fluid level is under “LOWER” level line → Replenish.  
Refer to “FRONT BRAKE FLUID LEVEL INSPECTION”.

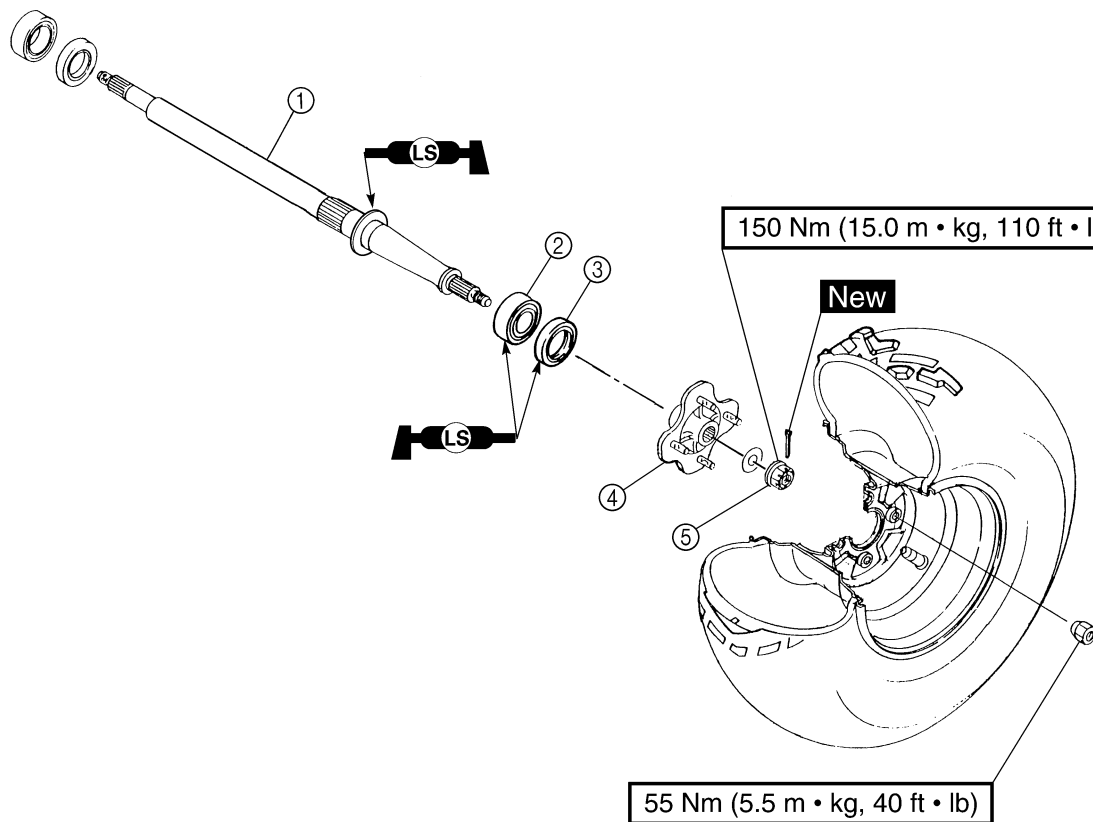
Ⓐ “LOWER” level line



## REAR WHEELS/REAR BRAKE AND REAR AXLE

- ① Rear axle
- ② Bearing
- ③ Oil seal
- ④ Wheel hub
- ⑤ Axle nut

A	TIRE SIZE: AT22 × 10-10
B	TIRE WEAR LIMIT: 2.0 mm (0.08 in)
C	RIM SIZE: 8 × 10AT
D	RIM RUNOUT LIMIT: Radial: 2 mm (0.08 in) Lateral: 2 mm (0.08 in)
E	REAR AXLE RUNOUT LIMIT: 1.5 mm (0.06 in)

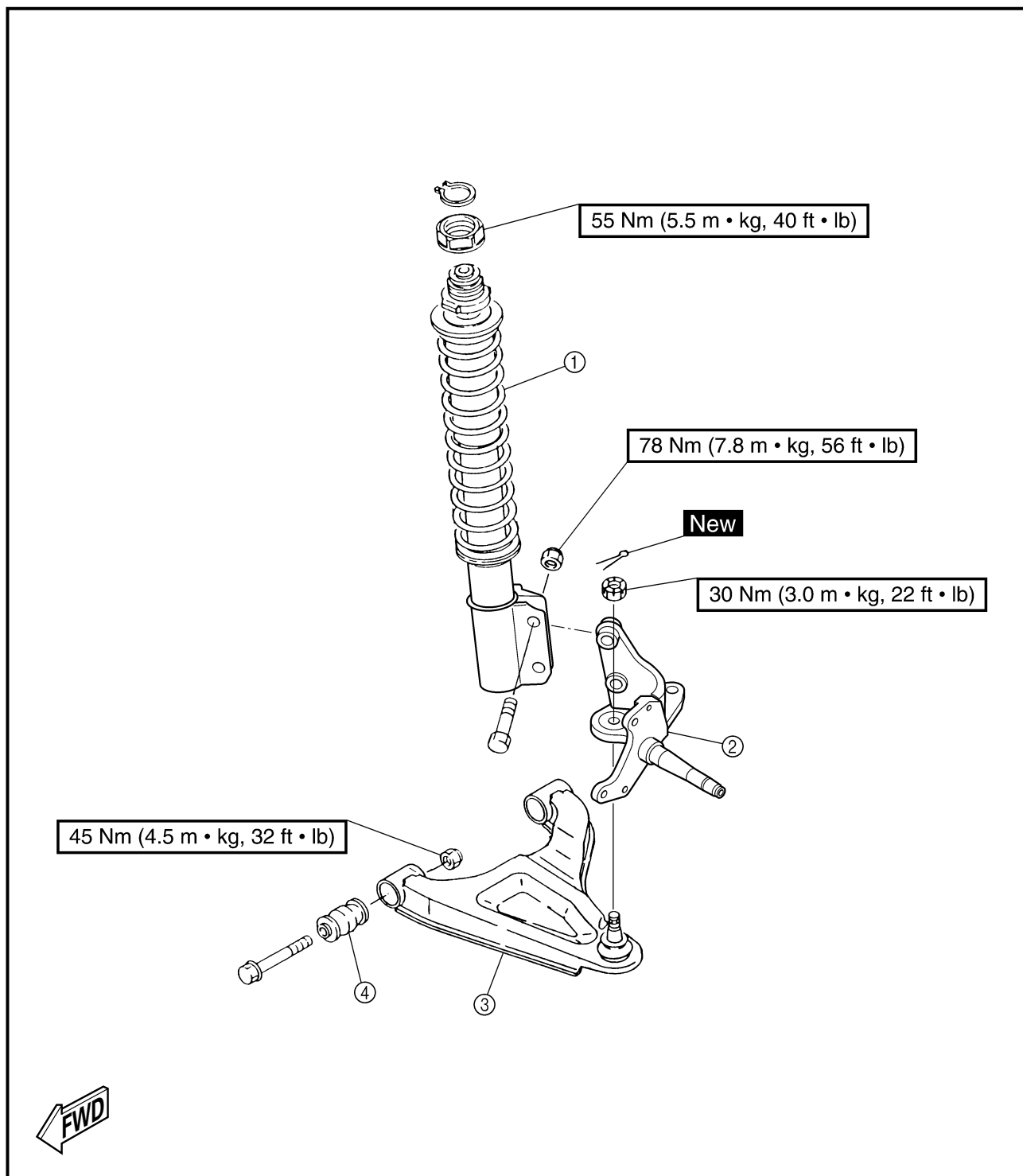






## FRONT SHOCK ABSORBER AND FRONT ARM

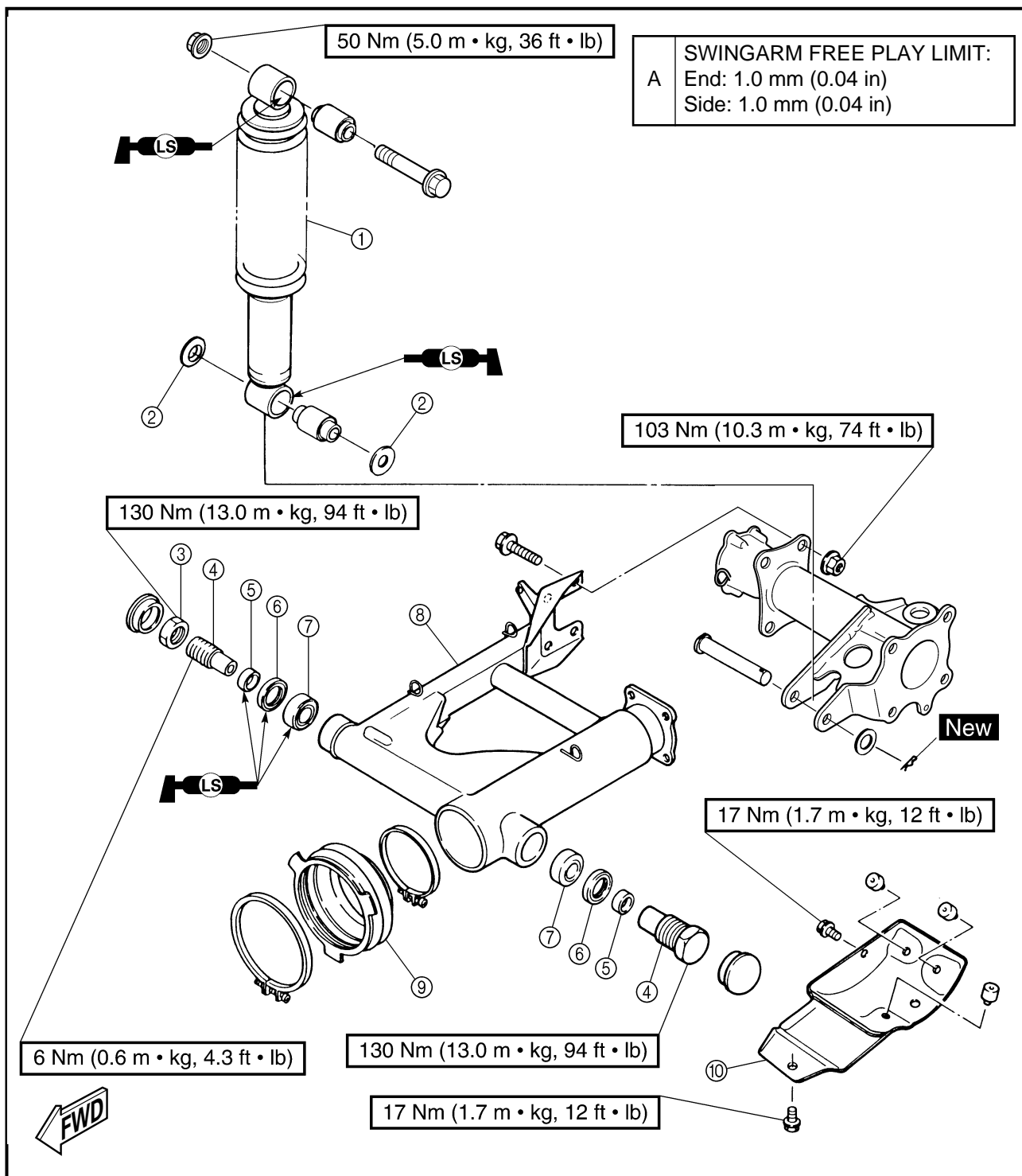
- ① Front shock absorber
- ② Steering knuckle
- ③ Lower arm
- ④ Bushing

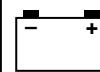




## REAR SHOCK ABSORBER AND SWINGARM

- ① Rear shock absorber
- ② Thrust cover
- ③ Locknut
- ④ Pivot shaft
- ⑤ Collar
- ⑥ Oil seal
- ⑦ Taper roller bearing
- ⑧ Swingarm
- ⑨ Rubber boot
- ⑩ Final gear case protector



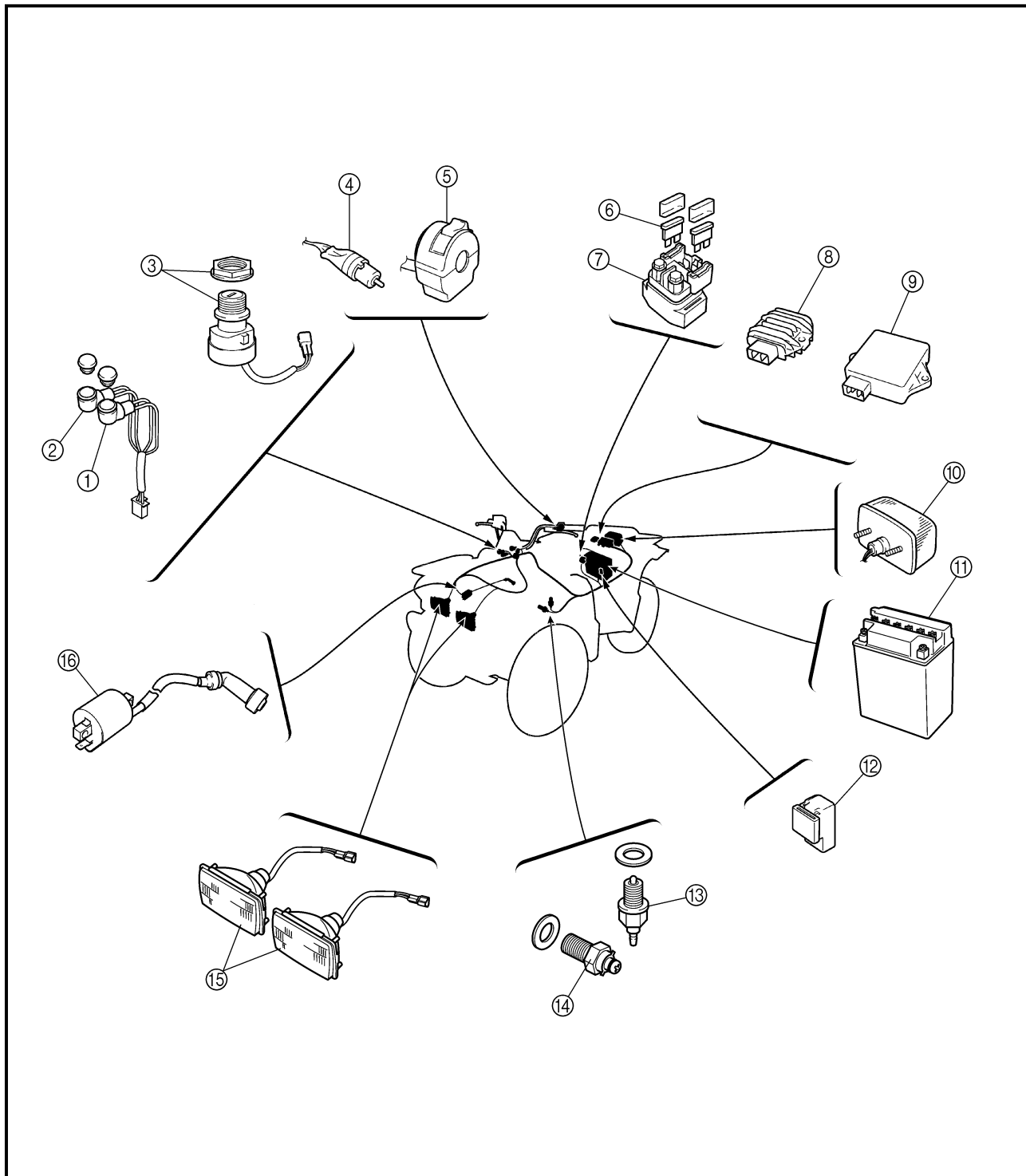


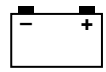
EB800000

## ELECTRICAL

## ELECTRICAL COMPONENTS

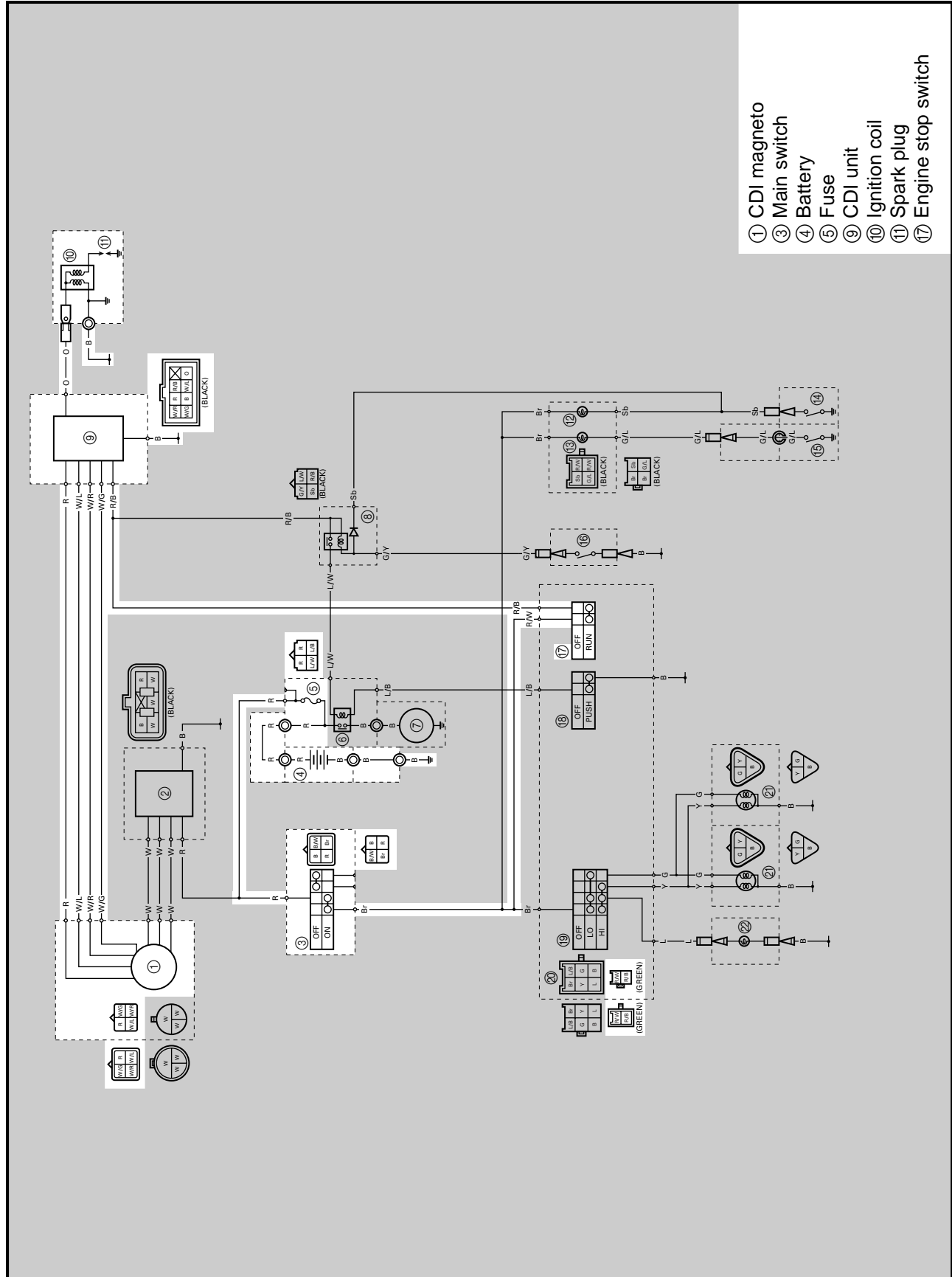
- |                           |                                  |                 |
|---------------------------|----------------------------------|-----------------|
| ① Reverse indicator light | ⑧ Rectifier/regulator            | ⑮ Headlight     |
| ② Neutral indicator light | ⑨ CDI unit                       | ⑯ Ignition coil |
| ③ Main switch             | ⑩ Taillight                      |                 |
| ④ Rear brake lever switch | ⑪ Battery                        |                 |
| ⑤ Handlebar switch        | ⑫ Starting circuit cut-off relay |                 |
| ⑥ Fuses                   | ⑬ Reverse switch                 |                 |
| ⑦ Starter relay           | ⑭ Neutral switch                 |                 |

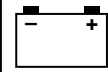




EB802000

## IGNITION SYSTEM CIRCUIT DIAGRAM





EB802010

### TROUBLESHOOTING

**IF THE IGNITION SYSTEM FAILS TO OPERATE (NO SPARK OR INTERMITTENT SPARK):**

#### Procedure

Check:

1. Fuse
2. Battery
3. Spark plug
4. Ignition spark gap
5. Spark plug cap resistance
6. Ignition coil resistance
7. Engine stop switch
8. Main switch
9. Pickup coil resistance
10. Charging/rotor rotation direction detection coil resistance
11. Wiring connection (the entire ignition system)

#### NOTE:

- Remove the following part(s) before troubleshooting:
  - 1) Seat
  - 2) Front carrier
  - 3) Front fender
- Use the following special tool(s) for troubleshooting.



**Dynamic spark tester:**

**P/N. YM-34487**

**Pocket tester:**

**P/N. YU-03112, 90890-03112**

EB802011

1. Fuse

Refer to "SWITCH INSPECTION".



CONTINUITY

NO CONTINUITY

Replace the fuse.

EB802012

2. Battery

- Check the battery condition.  
Refer to "BATTERY INSPECTION".

**Open-circuit voltage:**  
**12.8 V or more at 20 °C (68 °F)**



CORRECT

INCORRECT

- Clean the battery terminals.
- Recharge or replace the battery.

3. Spark plug

- Check the spark plug condition.
- Check the spark plug type.
- Check the spark plug gap.  
Refer to "SPARK PLUG INSPECTION".



\*

**Standard spark plug:**  
**DR7EA**



**Spark plug gap:**  
0.6 ~ 0.7 mm (0.024 ~ 0.028 in)

INCORRECT

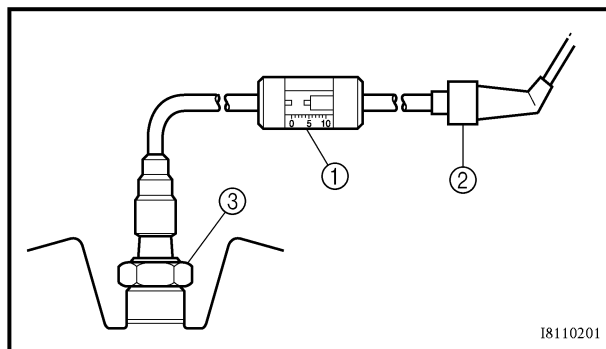


CORRECT

Repair or replace the spark plug.

### 4. Ignition spark gap

- Disconnect the spark plug cap from the spark plug.
- Connect the dynamic spark tester ① as shown.
- ② Spark plug cap
- ③ Spark plug
- Turn the main switch to "ON".
- Check the ignition spark gap.
- Crank the engine by pushing the starter switch, and increase the spark gap until a misfiring occurs.



MEETS SPECIFICATION



**Minimum spark gap:**  
6.0 mm (0.24 in)

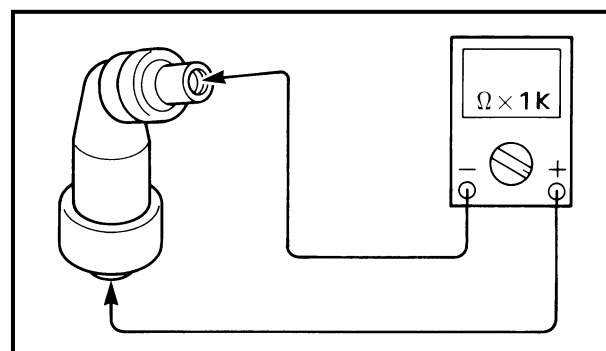
The ignition system is not faulty.



OUT OF SPECIFICATION  
OR NO SPARK

### 5. Spark plug cap resistance

- Remove the spark plug cap.
- Connect the pocket tester ( $\Omega \times 1 \text{ k}$ ) to the spark plug cap.



OUT OF SPECIFICATION

- Check that the spark plug cap has the specified resistance.

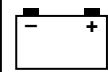


**Spark plug cap resistance:**  
10 k $\Omega$  at 20 °C (68 °F)

Replace the spark plug cap.



MEETS  
SPECIFICATION



### 6. Ignition coil resistance

- Disconnect the ignition coil connector from the wire harness.
- Connect the pocket tester ( $\Omega \times 1$ ) to the ignition coil.

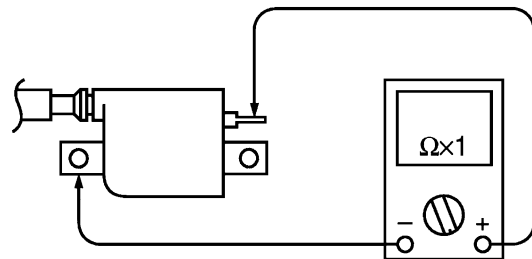
- Check that the primary coil has the specified resistance.



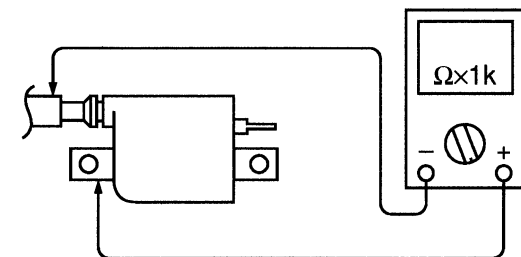
**Primary coil resistance:**  
**0.18 ~ 0.28  $\Omega$  at 20 °C (68°F)**

- Connect the pocket tester ( $\Omega \times 1$  k) to the ignition coil.

**Tester (+) lead → Orange lead terminal**  
**Tester (-) lead → Ignition coil base**



**Tester (+) lead → Ignition coil base**  
**Tester (-) lead → Spark plug lead**



- Check that the secondary coil has the specified resistance.



**Secondary coil resistance:**  
**6.3 ~ 9.5 k $\Omega$  at 20 °C (68°F)**



**BOTH MEET  
SPECIFICATION**

**OUT OF SPECIFICATION**

**Replace the ignition coil.**

### 7. Engine stop switch

Refer to "SWITCH INSPECTION".



**CORRECT**

**INCORRECT**

**Replace the handlebar switch (left).**

### 8. Main switch

Refer to "SWITCH INSPECTION".

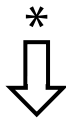
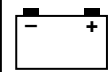


**CORRECT**

**INCORRECT**

**Replace the main switch.**

\*

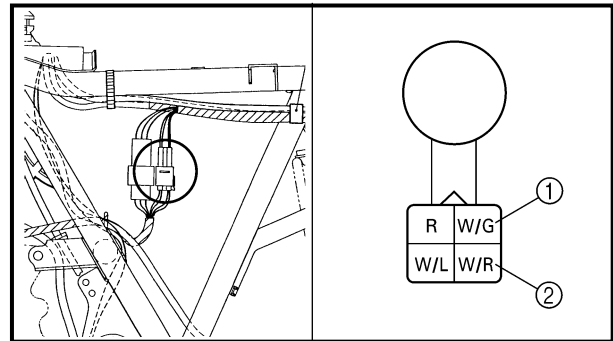


### 9. Pickup coil resistance

- Disconnect the CDI magneto coupler from the wire harness.
- Connect the pocket tester ( $\Omega \times 100$ ) to the pickup coil terminal.

**Tester (+) lead → White/Green terminal ①**

**Tester (-) lead → White/Red terminal ②**



- Check the pickup coil for the specified resistance.



**Pickup coil resistance:**  
**189 ~ 231  $\Omega$  at 20°C (68°F)**  
**(White/Green – White/Red)**

OUT OF SPECIFICATION

Replace the pickup coil/stator assembly.



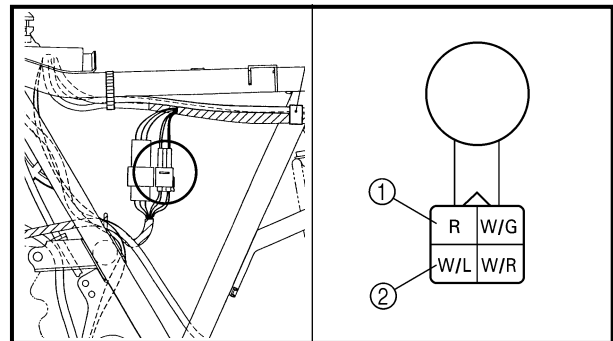
MEETS  
SPECIFICATION

### 10. Charging/rotor rotation direction detection coil resistance

- Disconnect the CDI magneto coupler from the wire harness.
- Connect the pocket tester ( $\Omega \times 100$ ) to the source coil terminal.

**Tester (+) lead → Red terminal ①**

**Tester (-) lead → White/Blue terminal ②**



- Check the charging/rotor rotation direction detection coil for the specified resistance.



**Charging/rotor rotation direction detection coil resistance:**  
**270 ~ 330  $\Omega$  at 20°C (68°F)**  
**(Red – White/Blue)**

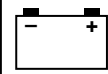
OUT OF SPECIFICATION

Replace the pickup coil/stator assembly.



MEETS  
SPECIFICATION





### 11. Wiring connection

- Check the connections of the entire ignition system.  
Refer to "CIRCUIT DIAGRAM".

POOR CONNECTION

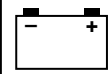


Properly connect the ignition system.



CORRECT

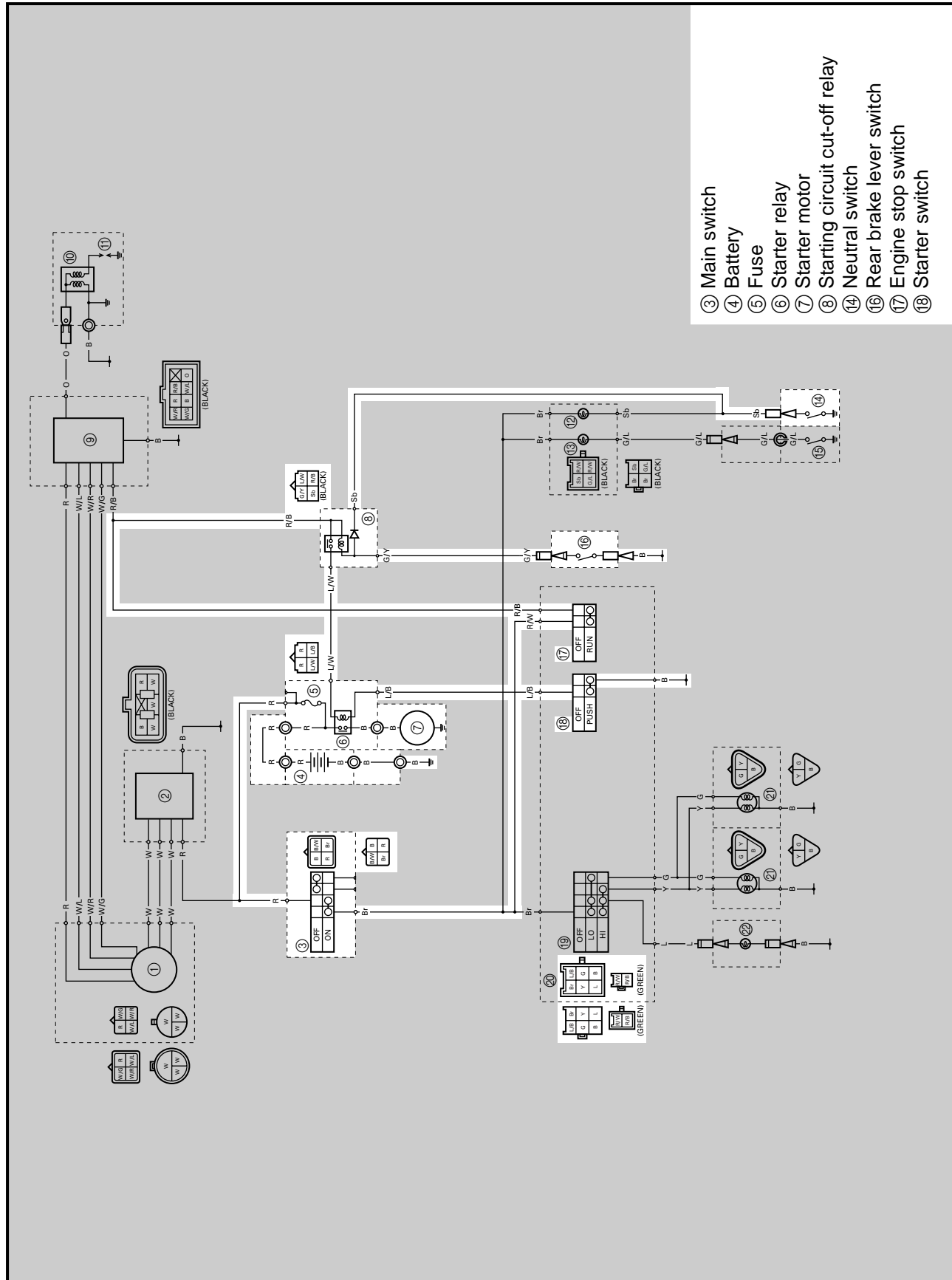
Replace the CDI unit.

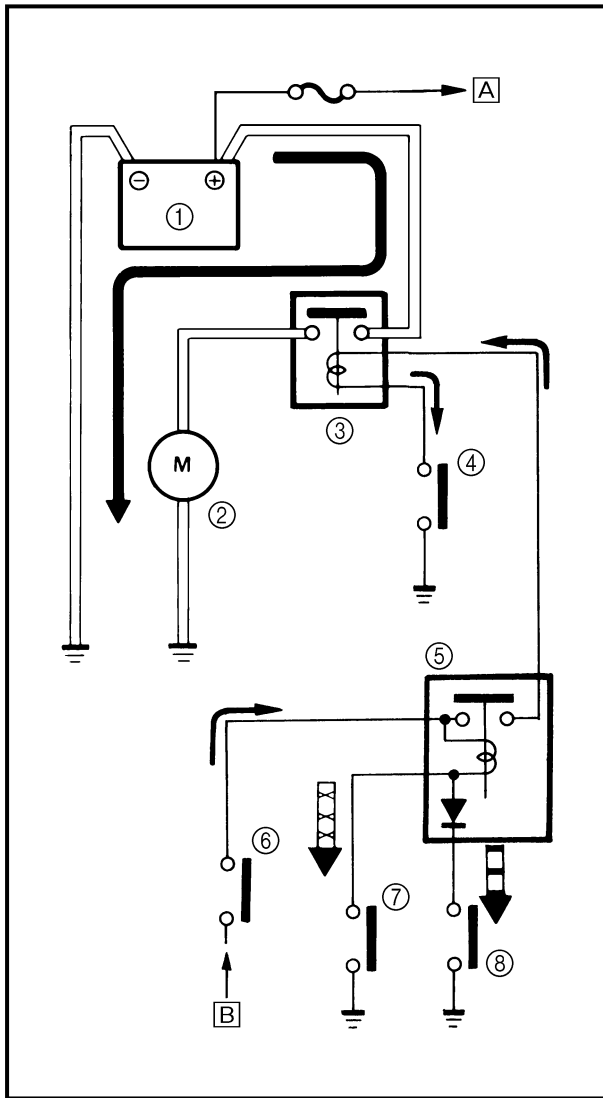
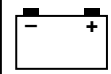


EB803000

## ELECTRIC STARTING SYSTEM

## CIRCUIT DIAGRAM





### STARTING CIRCUIT OPERATION

The starting circuit on this model consists of the starter motor, starter relay, starting circuit cut-off relay, rear brake lever switch, and neutral switch. If the main switch is on and engine stop switch is in the RUN position, the starter motor can be operated only if:

- The transmission is in neutral (the neutral switch is closed).
- or
- You pull in the rear brake lever (the rear brake lever switch is ON).

The starting circuit cut-off relay prevents the starter from operating when the select lever is in gear or in reverse and the rear brake lever is free. In this instance, the starting circuit cut-off relay is off so that current cannot reach the starter motor.

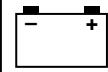


WHEN THE TRANSMISSION IS IN NEUTRAL



WHEN THE BRAKE LEVER IS PULLED IN

- ① Battery
- ② Starter motor
- ③ Starter relay
- ④ Start switch
- ⑤ Starting circuit cut-off relay
- ⑥ Engine stop switch
- ⑦ Rear brake lever switch
- ⑧ Neutral switch
- [A] TO MAIN SWITCH
- [B] FROM MAIN SWITCH



EB803020

## TROUBLESHOOTING

## IF THE STARTER MOTOR FAILS TO OPERATE:

## Procedure

Check:

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1.Fuse</li> <li>2.Battery</li> <li>3.Starter motor</li> <li>4.Starting circuit cut-off relay</li> <li>5.Starter relay</li> <li>6.Main switch</li> </ol> | <ol style="list-style-type: none"> <li>7.Engine stop switch</li> <li>8.Neutral switch</li> <li>9.Rear brake lever switch</li> <li>10. Start switch</li> <li>11. Wiring connection<br/>(the entire starting system)</li> </ol> |
|--|---|

## NOTE:

- Remove the following part(s) before troubleshooting:
  - 1)Seat
  - 2)Front carrier
  - 3)Front fender
- Use the following special tool(s) for troubleshooting.



Pocket tester:

P/N. YU-03112, 90890-03112

EB802011

1.Fuse

Refer to "SWITCH INSPECTION".



CONTINUITY

NO CONTINUITY

Replace the fuse.

EB802012

2.Battery

- Check the battery condition.  
Refer to "BATTERY INSPECTION".

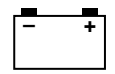
**Open-circuit voltage:**  
**12.8 V or more at 20 °C (68 °F)**



CORRECT

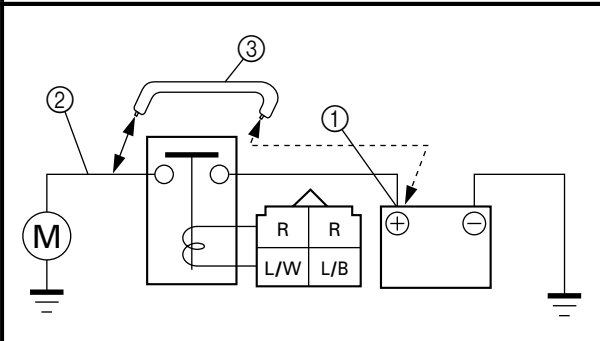
INCORRECT

- Clean the battery terminals.
- Recharge or replace the battery.



## 3. Starter motor

- Connect the battery positive terminal ① and starter motor lead ② using a jumper lead ③ \*.
- Check the operation of the starter motor.



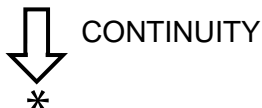
## 4. Starting circuit cut-off relay

- Remove the starting circuit cut-off relay from the wire harness.
- Connect the pocket tester ( $\Omega \times 1$ ) and the battery (12 V) to the starting circuit cut-off relay terminals.

**Battery (+) terminal** → Red/Black terminal ①  
**Battery (-) terminal** → Green/Yellow terminal ②

**Tester (+) lead** → Red/Black terminal ①  
**Tester (-) lead** → Blue/White terminal ③

- Check the starting circuit cut-off relay for continuity.



\*

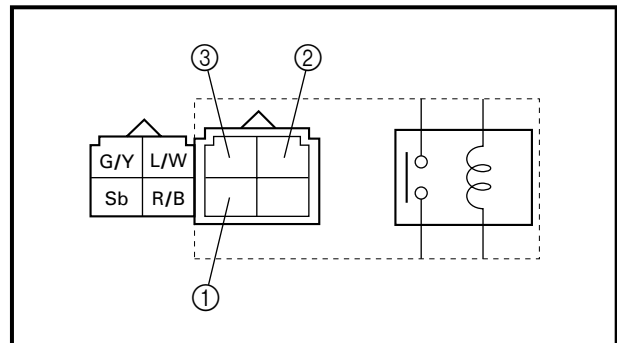
## ⚠ WARNING

- A wire that is used as a jumper lead must have the equivalent capacity or more as that of the battery lead, otherwise the jumper lead may burn.
- This check is likely to produce sparks, so be sure that no flammable gas or fluid is in the vicinity.

DOES NOT TURN



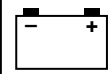
Repair or replace the starter motor.



NO CONTINUITY

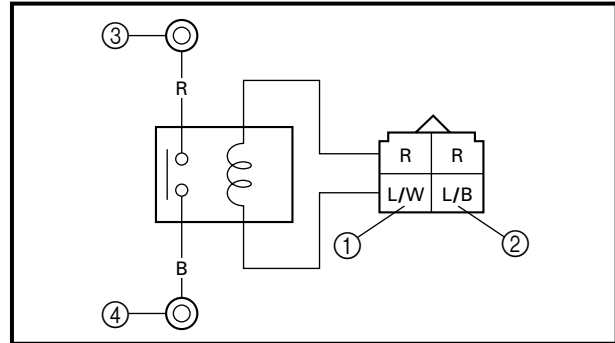


Replace the starting circuit cut-off relay.



## 5. Starter relay

- Remove the starter relay from the wire harness.
- Connect the pocket tester ( $\Omega \times 1$ ) and the battery (12 V) to the starter relay terminals.



**Battery (+) terminal** → **Blue/White terminal ①**  
**Battery (-) terminal** → **Blue/Black terminal ②**

**Tester (+) lead** → **Red terminal ③**  
**Tester (-) lead** → **Black terminal ④**

- Check the starter relay for continuity.

NO CONTINUITY

Replace the starter relay.



CONTINUITY

## 6. Main switch

Refer to "SWITCH INSPECTION".

INCORRECT

Replace the main switch.



CORRECT

## 7. Engine stop switch

Refer to "SWITCH INSPECTION".

INCORRECT

Replace the handlebar switch (left).



CORRECT

## 8. Neutral switch

Refer to "SWITCH INSPECTION".

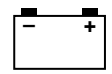
INCORRECT

Replace the neutral switch.



CORRECT

\*



9.Rear brake lever switch

Refer to "SWITCH INSPECTION".

INCORRECT



CORRECT

Replace the rear brake lever switch.

10.Start switch

Refer to "SWITCH INSPECTION".

INCORRECT



CORRECT

Replace the handlebar switch (left).

EB803028

11.Wiring connection

- Check the connections of the entire starting system.  
Refer to "CIRCUIT DIAGRAM".

POOR CONNECTION

Properly connect the starting system.

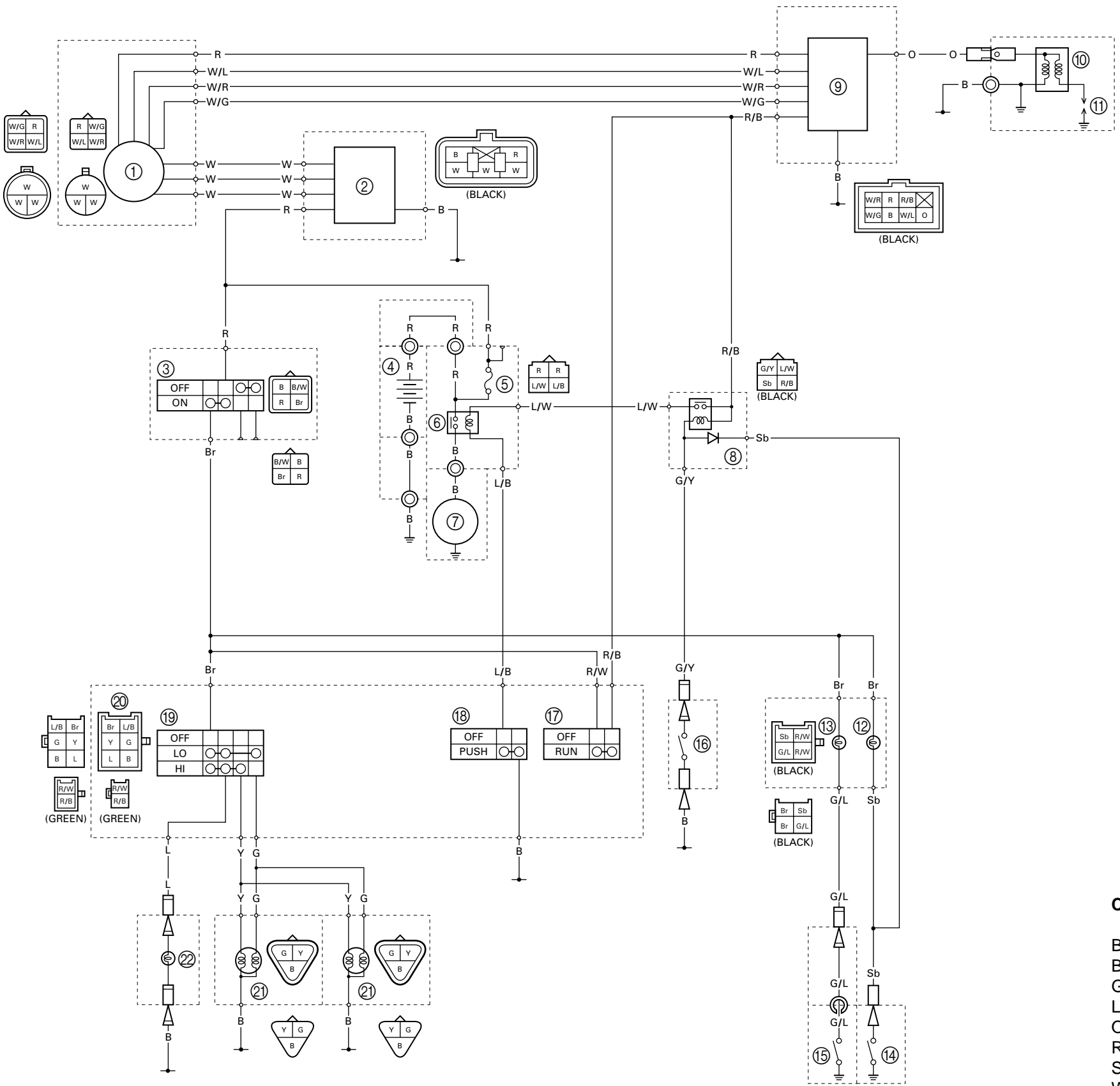


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2500 SHINGAI IWATA SHIZUOKA JAPAN

PRINTED IN U.S.A.



# YFM250XN WIRING DIAGRAM



- ① CDI magneto
- ② Rectifier/regulator
- ③ Main switch
- ④ Battery
- ⑤ Fuse
- ⑥ Starter relay
- ⑦ Starter motor
- ⑧ Starting circuit cut-off relay
- ⑨ CDI unit
- ⑩ Ignition coil
- ⑪ Spark plug
- ⑫ Neutral indicator light
- ⑬ Reverse indicator light
- ⑭ Neutral switch
- ⑮ Reverse switch
- ⑯ Rear brake lever switch
- ⑰ Engine stop switch
- ⑱ Starter switch
- ⑲ Lights switch
- ⑳ Headlight
- ㉑ Handlebar switch
- ㉒ Taillight

## COLOR CODE

B .....	Black	G/L .....	Green/Blue
Br .....	Brown	G/Y .....	Green/Yellow
G .....	Green	L/B .....	Blue/Black
L .....	Blue	L/W .....	Blue/White
O .....	Orange	R/B .....	Red/Black
R .....	Red	R/W .....	Red/White
Sb .....	Sky blue	W/G .....	White/Green
W .....	White	W/L .....	White/Blue
Y .....	Yellow	W/R .....	White/Red
B/W .....	Black/White	Y/R .....	Yellow/Red
Br/W .....	Brown/White		



# **YFM250XP**

# **SUPPLEMENTARY SERVICE MANUAL**

---

## FOREWORD

This Supplementary Service Manual has been prepared to introduce new service and new data for the YFM250XP. For complete information on service procedures, it is necessary to use this Supplementary Service Manual together with the following manual.

**YFM250XL(C) SERVICE MANUAL: LIT-11616-12-01 (4XE-F8197-10)**  
**YFM250XN SUPPLEMENTARY SERVICE MANUAL: LIT-11616-14-17 (4XE-F8197-11)**

**YFM250XP  
SUPPLEMENTARY  
SERVICE MANUAL**

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**First Edition, June 2001**

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**LIT-11616-15-03**

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## NOTICE

This manual was produced by the Yamaha Motor Company primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual, so it is assumed that anyone who uses this book to perform maintenance and repairs on Yamaha machine has a basic understanding of the mechanical ideas and the procedures of machine repair. Repairs attempted by anyone without this knowledge are likely to render the machine unsafe and unfit for use.

Yamaha Motor Company, Ltd. is continually striving to improve all its models. Modifications and significant changes in specifications or procedures will be forwarded to all authorized Yamaha dealers and will appear in future editions of this manual where applicable.

**NOTE:**

Designs and specifications are subject to change without notice.

---

## IMPORTANT INFORMATION

Particularly important information is distinguished in this manual by the following notations.



The Safety Alert Symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

**⚠ WARNING**

Failure to follow WARNING instructions could result in severe injury or death to the machine operator, a bystander or a person inspecting or repairing the machine.

**CAUTION:**

A CAUTION indicates special precautions that must be taken to avoid damage to the machine.

**NOTE:**

A NOTE provides key information to make procedures easier or clearer.

# HOW TO USE THIS MANUAL

## CONSTRUCTION OF THIS MANUAL

This manual consists of chapters for the main categories of subjects. (See “Illustrated symbols”)

- 1st title ①: This is a chapter with its symbol on the upper right of each page.
- 2nd title ②: This title appears on the upper of each page on the left of the chapter symbol. (For the chapter “Periodic inspection and adjustment” the 3rd title appears.)
- 3rd title ③: This is a final title.

## MANUAL FORMAT

All of the procedures in this manual are organized in a sequential, step-by-step format. The information has been compiled to provide the mechanic with an easy to read, handy reference that contains comprehensive explanations of all disassembly, repair, assembly, and inspections.

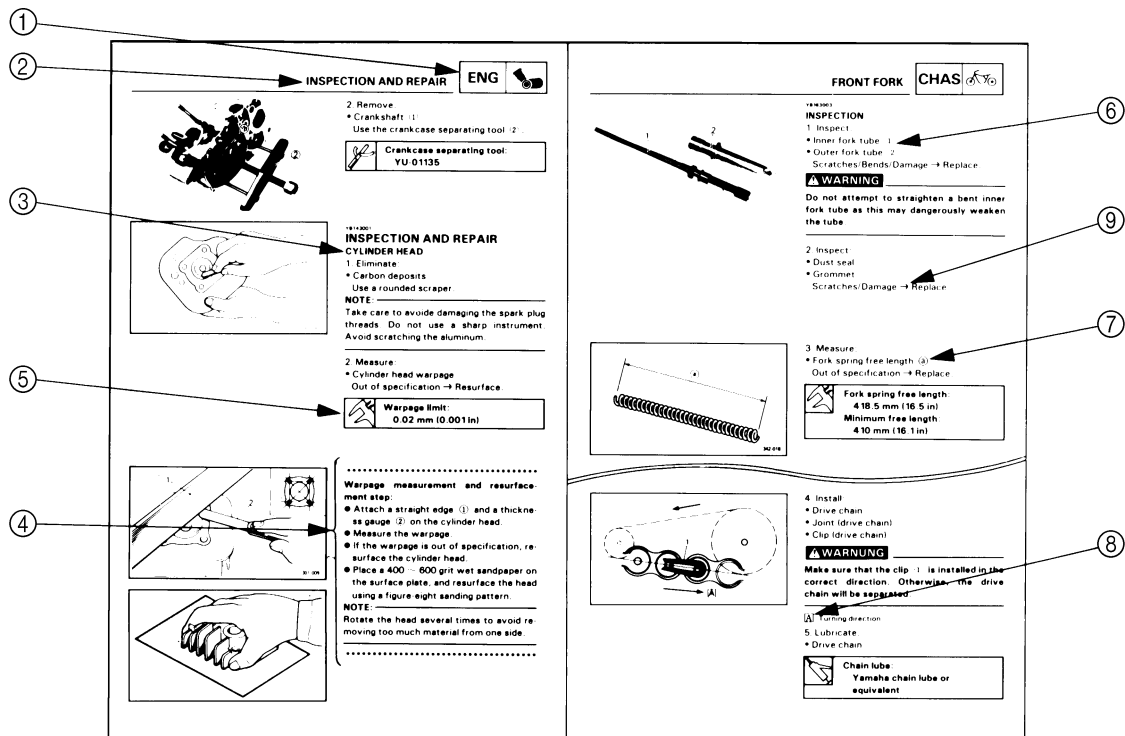
A set of particularly important procedure ④ is placed between a line of asterisks “\*” with each procedure preceded by “●”.








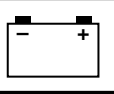


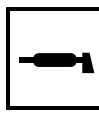

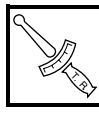

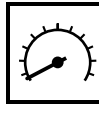
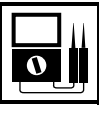








## IMPORTANT FEATURES

- Data and a special tool are framed in a box preceded by a relevant symbol ⑤.
- An encircled numeral ⑥ indicates a part name, and an encircled alphabetical letter data or an alignment mark ⑦, the others being indicated by an alphabetical letter in a box ⑧.
- A condition of a faulty component will precede an arrow symbol ⑨ and the course of action will follow it.

## EXPLODED DIAGRAM

Each chapter provides exploded diagrams before each disassembly section for ease in identifying correct disassembly and assembly procedures.



① GEN INFO 	② SPEC 		
③ CHK ADJ 	④ ENG 		
⑤ CARB 	⑥ DRIV 		
⑦ CHAS 	⑧ ELEC 		
⑨ TRBL SHTG 	⑩ 		
⑪ 	⑫ 		
⑬ 	⑭ 		
⑮ 	⑯ 		
⑰ 	⑱ 	⑲ 	
⑳ 	㉑ 	㉒ 	㉓ 
㉔ 	㉕ New		

EB003000

## ILLUSTRATED SYMBOLS

Illustrated symbols ① to ⑨ are printed on the top right of each page and indicate the subject of each chapter.

- ① General information
- ② Specifications
- ③ Periodic checks and adjustments
- ④ Engine
- ⑤ Carburetion
- ⑥ Drive train
- ⑦ Chassis
- ⑧ Electrical
- ⑨ Troubleshooting

Illustrated symbols ⑩ to ⑯ are used to identify the specifications appearing in the text.

- ⑩ Filling fluid
- ⑪ Lubricant
- ⑫ Special tool
- ⑬ Torque
- ⑭ Wear limit, clearance
- ⑮ Engine speed
- ⑯  $\Omega$ , V, A

Illustrated symbols ⑰ to ㉓ in the exploded diagrams indicate the types of lubricants and lubrication points.

- ⑰ Apply engine oil
- ⑱ Apply gear oil
- ⑲ Apply molybdenum disulfide oil
- ⑳ Apply wheel bearing grease
- ㉑ Apply lightweight lithium soap base grease
- ㉒ Apply molybdenum disulfide grease
- ㉓ Apply silicon grease

Illustrated symbols ㉔ to ㉕ in the exploded diagrams indicate where to apply a locking agent ㉔ and when to install a new part ㉕.

- ㉔ Apply the locking agent (LOCTITE®)
- ㉕ Replace

---

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## SPECIFICATIONS

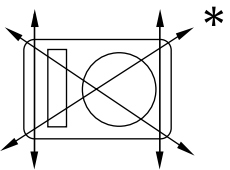
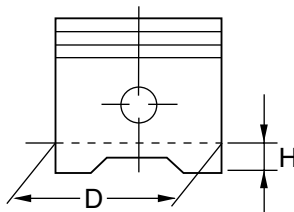
## GENERAL SPECIFICATIONS

Item		Standard
Model code:		4XEE (USA)
Brake:		
Front brake	type	Dual disc brake
	operation	Right hand operation
Rear brake	type	Drum brake (fully sealed)
	operation	Left hand and right foot operation
Electrical:		
Ignition system		DC.C.D.I.
Generator system		A.C. magneto
Battery type		YB14A-A2
Battery capacity		12 V 14 AH
Bulb wattage × quantity:		
Headlight		12 V 25 W/25 W × 2
Tail/brake light		12 V 5 W/21 W × 1
Indicator lights:		
Neutral		12 V 1.7 W × 1
Reverse		12 V 1.7 W × 1





# MAINTENANCE SPECIFICATIONS ENGINE

Item	Standard	Limit
Cylinder head: Warp limit  Measuring point *	----  Lines indicate straightedge measurement.	0.03 mm (0.001 in)
Piston: Piston to cylinder clearance Piston size "D"  Measuring point "H" Oversize 2nd Oversize 4th Piston off-set Piston off-set direction Piston pin bore inside diameter Piston pin outside diameter	0.04 ~ 0.06 mm (0.0016 ~ 0.0024 in) 70.92 ~ 70.97 mm (2.792 ~ 2.794 in)  4.0 mm (0.16 in) from bottom line of piston skirt 71.5 mm (2.81 in) 72 mm (2.83 in) 0.5 mm (0.02 in) Intake side 16.002 ~ 16.013 mm (0.6300 ~ 0.6304 in) 15.991 ~ 16.000 mm (0.6296 ~ 0.6299 in)	0.15 mm (0.0059 in) ---- ---- ---- ---- ---- ----
Lubrication system: Oil filter type Oil pump type Tip clearance "A" or "B" Side clearance Bypass valve setting pressure Oil pressure (hot) Pressure check location	Wire mesh Trochoid type 0.15 mm (0.006 in)  0.04 ~ 0.09 mm (0.002 ~ 0.004 in) 80 ~ 120 kPa (0.8 ~ 1.2 kg/cm <sup>2</sup> , 11 ~ 17 psi) 52 kPa (0.52 kg/cm <sup>2</sup> , 7.5 psi) at 7,500 r/min Element cover	---- ---- 0.20 mm (0.008 in) 0.09 mm (0.004 in) ---- ---- ----



## CHASSIS

Item	Standard	Limit
Rear suspension:		
Shock absorber travel	85 mm (3.35 in)	----
Suspension spring free length	268 mm (10.55 in)	----
Fitting length	244 mm (9.61 in)	----
Spring rate	39 N/mm (3.9 kg/mm, 222.69 lb/in)/0 ~ 85 mm (0 ~ 3.35 in)	----
Optional spring	No	----

## Tightening torques

Part to be tightened	Parts name	Thread size	Q'ty	Tightening torque			Remarks
				Nm	m·kg	ft·lb	
Master cylinder and brake hose	Bolt	M10 × 1.25	1	23	2.3	17	
Steering shaft and upper handle-bar holder	Bolt	M8 × 1.25	4	23	2.3	14	

## ELECTRICAL

Item	Standard	Limit
Charging system:		
Model/manufacture	F4T259/MITSUBISHI	
Type	A.C. magneto	----
Nominal output	14 V 16 A at 5,000 r/min	----
Stator coil resistance/color	0.49 ~ 0.59 Ω at 20°C (68°F)/ White – White	----

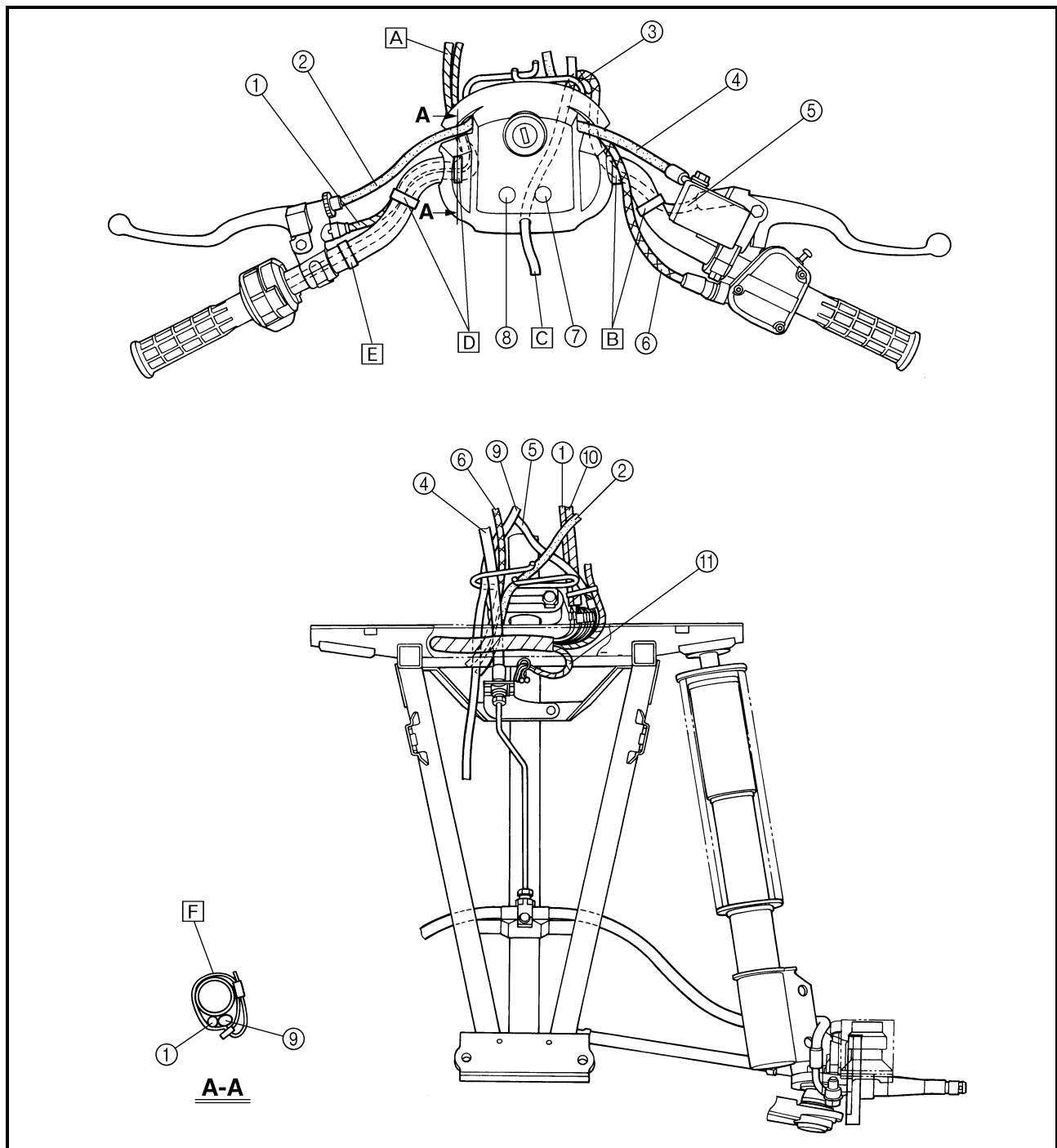


## CABLE ROUTING

- ① Rear brake lever switch lead
- ② Rear brake cable
- ③ Cable guide
- ④ Front brake hose
- ⑤ Front brake light switch lead
- ⑥ Throttle cable
- ⑦ Neutral indicator light
- ⑧ Reverse indicator light
- ⑨ Fuel tank breather hose
- ⑩ Handlebar switch assembly lead
- ⑪ Headlight leads

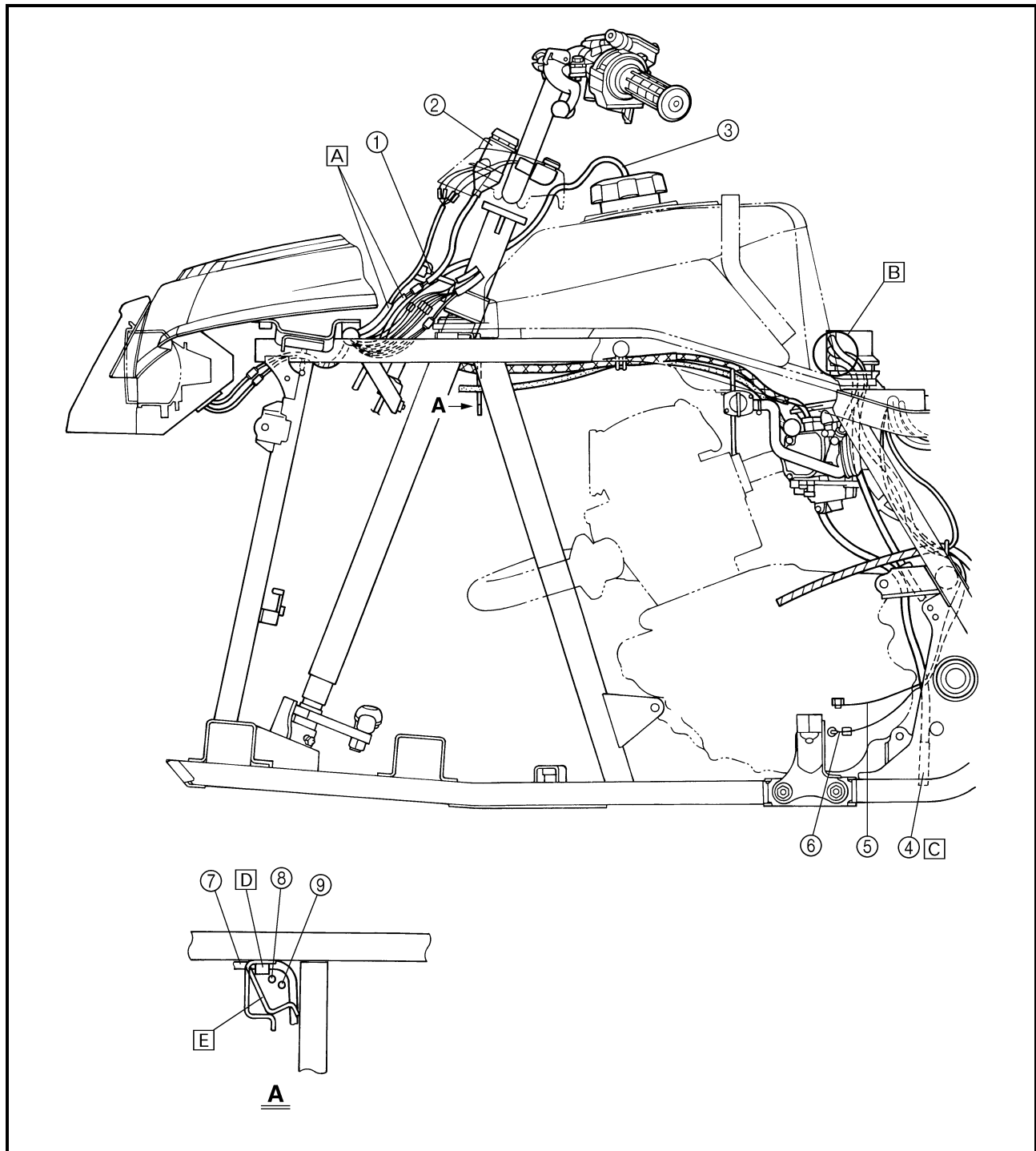
- [A] Do not route the handlebar switch assembly lead through the lower bracket cable guide.
- [B] Fasten the front brake light switch lead to the handlebar with the plastic band.
- [C] Route the fuel tank breather hose through the hole in the handlebar cover and then to the right of the handlebar (below the handlebar, not over it). Then, pass the hose through the cable guide.

- [D] Fasten the handlebar switch assembly lead and rear brake lever switch lead to the handlebar with the plastic bands.
- [E] Fasten the handlebar switch assembly lead to the handlebar with the plastic band.
- [F] Fasten the handlebar switch assembly lead and rear brake lever switch lead underneath the handlebar. Position the plastic band with its tab facing down.





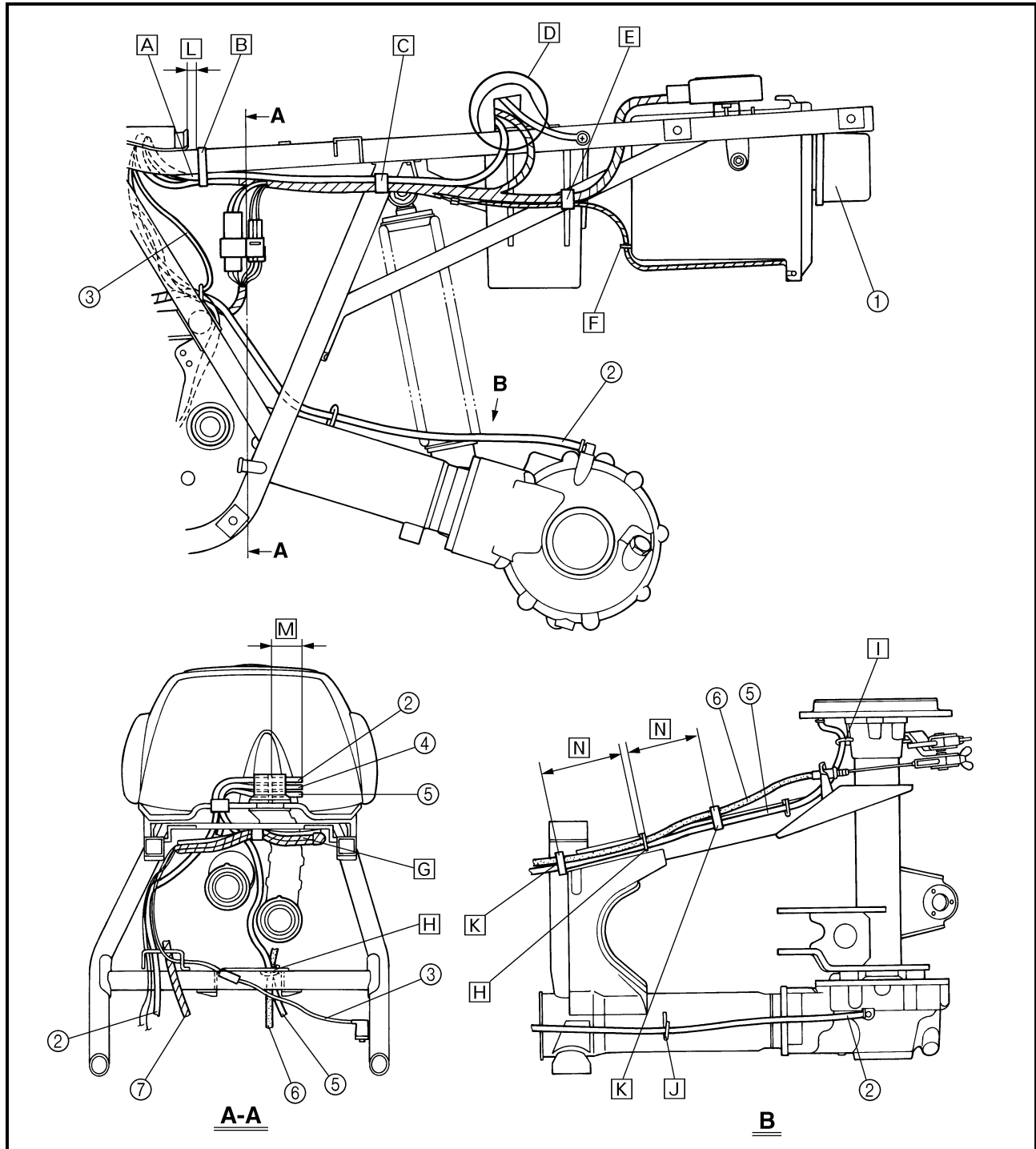
- ① Cable guide
  - ② Main switch
  - ③ Fuel tank breather hose
  - ④ Carburetor overflow hose
  - ⑤ Reverse switch lead
  - ⑥ Neutral switch lead
  - ⑦ Starter motor lead
  - ⑧ Throttle cable
  - ⑨ Rear brake cable
- A** Route the main switch lead and indicator light lead to the side of the cable guide.
- B** Insert the carburetor air vent hose, rear brake breather hose, and final gear case breather hose into the air duct after routing them through the fuel tank grommet.
- C** Route the carburetor overflow hose between the engine and upper rear engine mount and then between the engine and swingarm. Make sure that the hose is not pinched.
- D** Fasten the starter motor lead to the frame with the plastic clamp. Route the starter motor lead over the throttle cable and rear brake cable.
- E** Bend the cable guide after routing the cables.





- ① Tail/brake light
- ② Final gear case breather hose
- ③ Front brake light switch lead
- ④ Carburetor air vent hose
- ⑤ Rear brake breather hose
- ⑥ Rear brake cable
- ⑦ CDI magneto lead

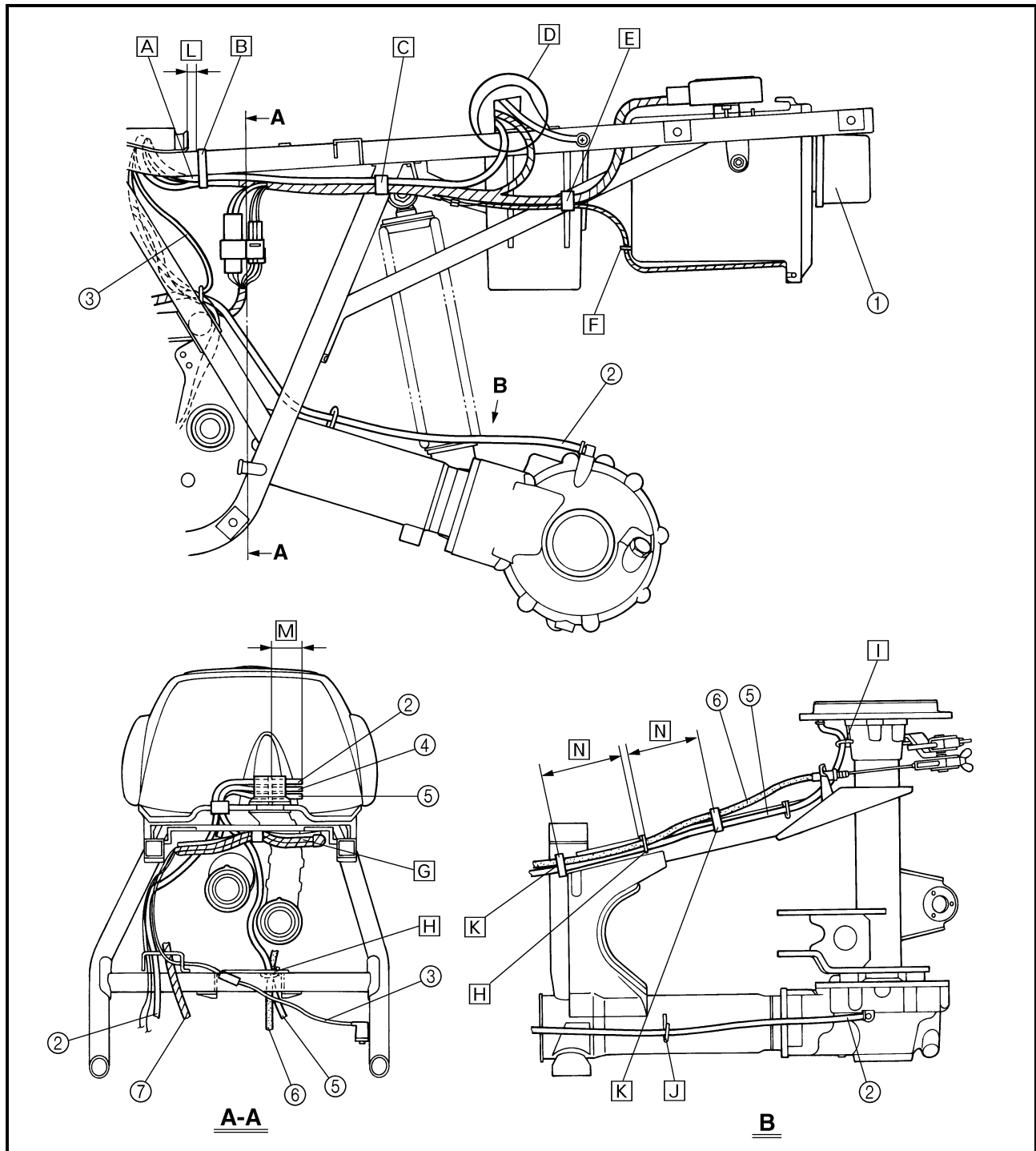
- [A] Make sure that the starter motor lead has no slack.
- [B] Fasten the starter motor lead and wire harness to the frame with the plastic band.
- [C] Fasten the starter motor lead and wire harness to the frame with the plastic clamp.
- [D] Route the starter motor lead, wire harness, and battery  $\ominus$  lead through the hole in the rear fender.
- [E] Fasten the taillight lead and wire harness to the frame with the plastic clamp.





- [F] Fasten the tail/brake light lead to the storage box with the plastic clamp.
- [G] Fasten the starter motor lead and wire harness to the frame with the plastic clamp.
- [H] Route the rear brake cable and rear brake breather hose through the cable guide.
- [I] Route the rear brake breather hose through the cable guide.
- [J] Route the final gear case breather hose through the cable guide.

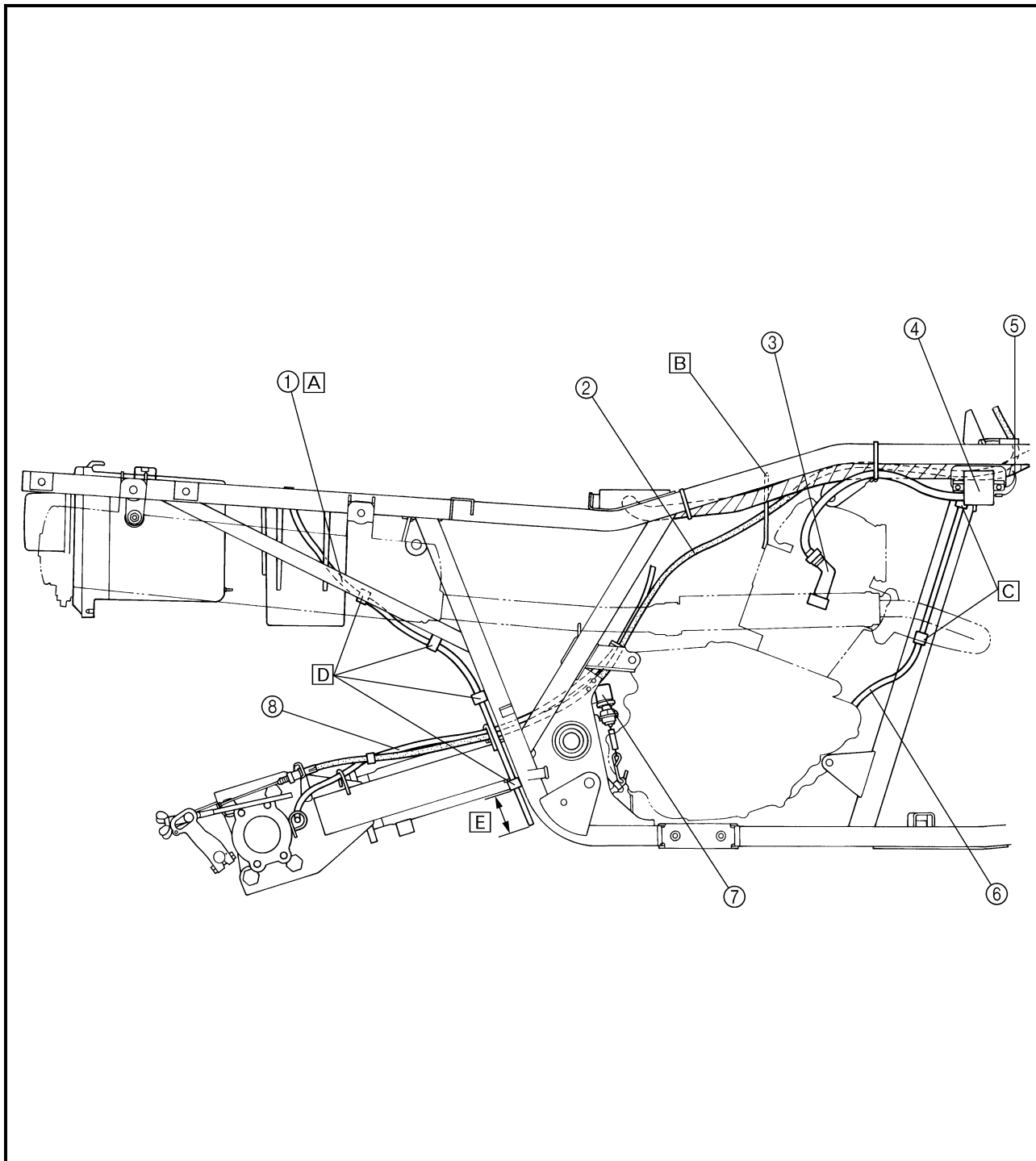
- [K] Fasten the rear brake cable and rear brake breather hose to the swingarm with the plastic clips.
- [L] 10 mm (0.4 in)
- [M] 40 ~ 50 mm (1.6 ~ 2.0 in)
- [N] 100 mm (4.0 in)





- ① Battery breather hose
- ② Rear brake cable
- ③ Spark plug cap
- ④ Ignition coil
- ⑤ Ignition coil lead
- ⑥ Starter motor lead
- ⑦ Rear brake light switch
- ⑧ Rear brake breather hose

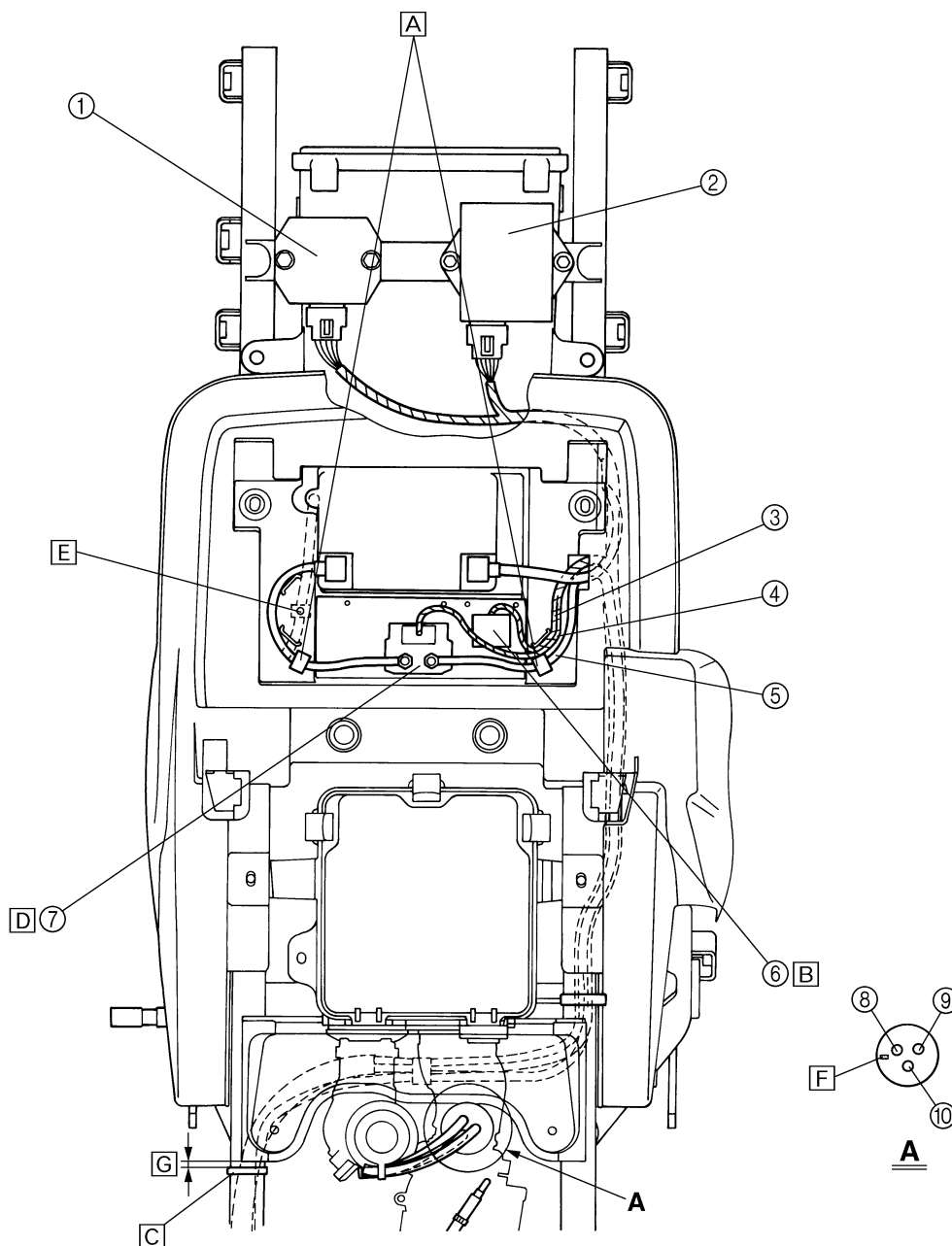
- A Make sure that the battery breather hose is not kinked or bent.
- B Route the rear brake cable through the cable guide on the cylinder.
- C Fasten the starter motor lead to the frame with the plastic clamps.
- D Fasten the battery breather hose to the frame with the plastic clamps.
- E 50 ~ 60 mm (2.0 ~ 2.4 in)





- ① Rectifier/regulator
- ② CDI unit
- ③ Starting circuit cut-off relay lead
- ④ Starter relay lead
- ⑤ Starter motor lead
- ⑥ Starting circuit cut-off relay
- ⑦ Starter relay
- ⑧ Rear brake breather hose
- ⑨ Carburetor air vent hose
- ⑩ Final gear case breather hose

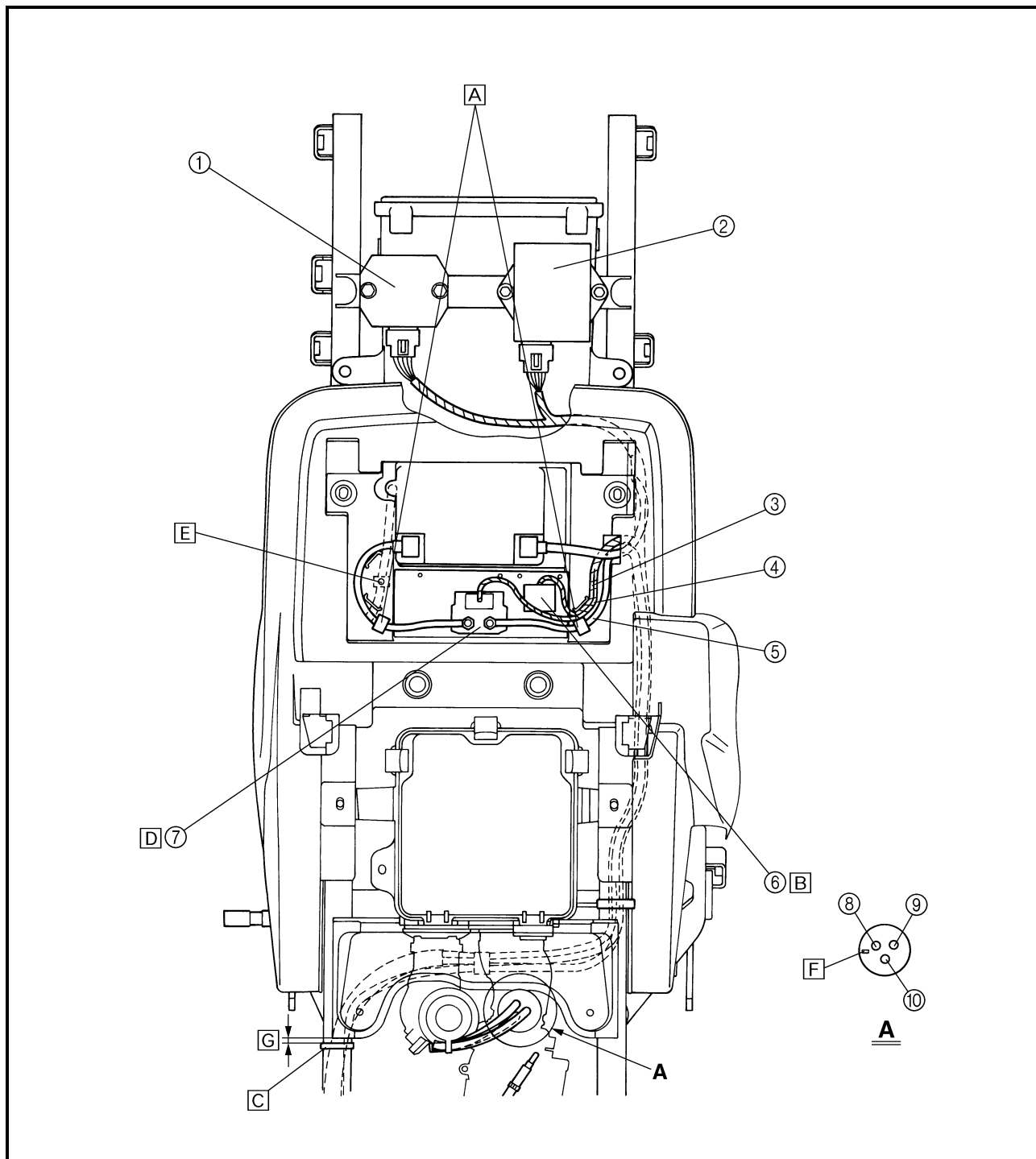
- [A] Fasten the battery ⊕ lead and starter motor lead to the rear fender with the plastic clamps.
- [B] Install the starter circuit cut-off relay onto the tab with its terminal side facing down.
- [C] Fasten the wire harness and starter motor lead to the frame with the plastic locking tie.
- [D] Install the starter relay onto the tabs with its terminal side facing up.
- [E] Fasten the battery breather hose to the rear fender with the plastic clamp and then insert the clamp into the hole in the rear fender.







- F Make sure that the grommet is installed with the mark facing forward.
- G 5 mm (0.2 in)

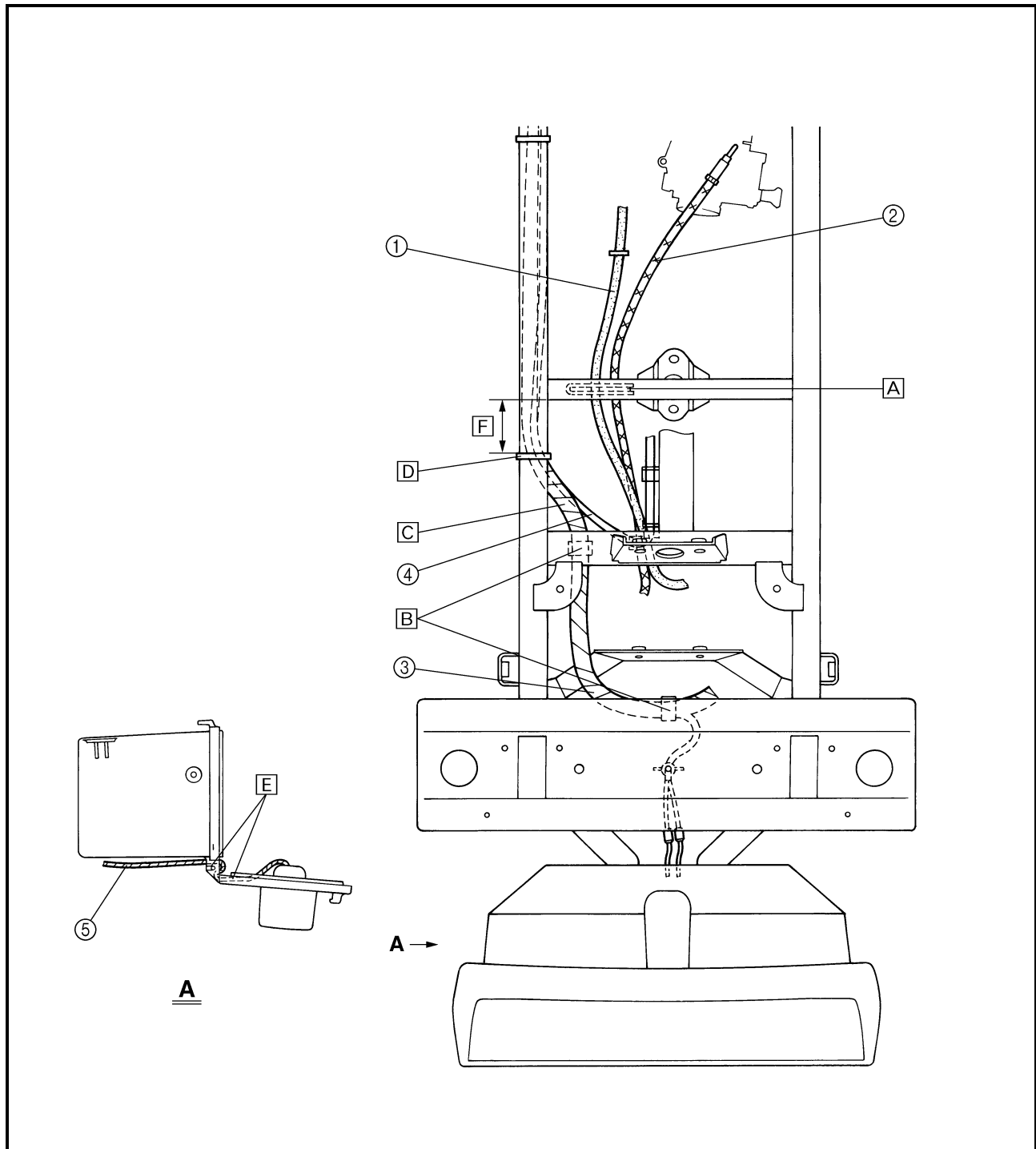




- ① Rear brake cable
- ② Throttle cable
- ③ Wire harness
- ④ Starter motor lead
- ⑤ Tail/brake light lead

- A** Route the throttle cable and rear brake cable through the cable guide. Make sure that the throttle cable is routed to the inside of the rear brake cable.
- B** Fasten the wire harness to the frame with the plastic clamps.

- C** Make sure the starter motor lead and wire harness do not contact the ignition coil.
- D** Fasten the wire harness, starter motor lead, and ignition coil lead to the frame with the plastic locking tie.
- E** Route the taillight lead through the lead holders on the lid and the bottom of the storage box.
- F** 50 mm (2.0 in)



EB300000

## PERIODIC CHECKS AND ADJUSTMENTS

### INTRODUCTION

This chapter includes all information necessary to perform recommended inspections and adjustments. These preventive maintenance procedures, if followed, will ensure more reliable vehicle operation and a longer service life. The need for costly overhaul work will be greatly reduced. This information applies to vehicles already in service as well as to new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

EB301000

### PERIODIC MAINTENANCE/LUBRICATION INTERVALS

ITEM	ROUTINE	INITIAL			EVERY	
		1 month	3 months	6 months	6 months	1 year
<b>Valves*</b>	<ul style="list-style-type: none"> <li>• Check valve clearance.</li> <li>• Adjust if necessary.</li> </ul>	○		○	○	○
<b>Spark plug</b>	<ul style="list-style-type: none"> <li>• Check condition.</li> <li>• Adjust gap and clean.</li> <li>• Replace if necessary.</li> </ul>	○	○	○	○	○
<b>Air filter</b>	<ul style="list-style-type: none"> <li>• Clean.</li> <li>• Replace if necessary.</li> </ul>	Every 20 ~ 40 hours (more often in wet or dusty areas)				
<b>Carburetor*</b>	<ul style="list-style-type: none"> <li>• Check idle speed/starter operation.</li> <li>• Adjust if necessary.</li> </ul>		○	○	○	○
<b>Cylinder head breather system*</b>	<ul style="list-style-type: none"> <li>• Check breather hose for cracks or damage.</li> <li>• Replace if necessary.</li> </ul>			○	○	○
<b>Exhaust system*</b>	<ul style="list-style-type: none"> <li>• Check for leakage.</li> <li>• Retighten if necessary.</li> <li>• Replace gasket if necessary.</li> </ul>			○	○	○
<b>Spark arrester</b>	<ul style="list-style-type: none"> <li>• Clean.</li> </ul>			○	○	○
<b>Fuel line*</b>	<ul style="list-style-type: none"> <li>• Check fuel hose for cracks or damage.</li> <li>• Replace if necessary.</li> </ul>			○	○	○
<b>Engine oil</b>	<ul style="list-style-type: none"> <li>• Replace (Warm engine before draining).</li> </ul>	○		○	○	○
<b>Engine oil filter</b>	<ul style="list-style-type: none"> <li>• Clean.</li> </ul>	○		○		○
<b>Engine oil strainer</b>	<ul style="list-style-type: none"> <li>• Clean.</li> </ul>	○		○		○
<b>Final gear oil</b>	<ul style="list-style-type: none"> <li>• Check oil level/oil leakage.</li> <li>• Replace.</li> </ul>	○				○
<b>Front brake*</b>	<ul style="list-style-type: none"> <li>• Check operation/fluid leakage/See NOTE page 13.</li> <li>• Correct if necessary.</li> </ul>	○	○	○	○	○
<b>Rear brake*</b>	<ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Adjust if necessary.</li> </ul>	○	○	○	○	○
<b>Clutch*</b>	<ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Adjust if necessary.</li> </ul>	○		○	○	○
<b>Wheels*</b>	<ul style="list-style-type: none"> <li>• Check balance/damage/runout.</li> <li>• Repair if necessary.</li> </ul>	○		○	○	○
<b>Wheel bearings*</b>	<ul style="list-style-type: none"> <li>• Check bearing assembly for looseness/damage.</li> <li>• Replace if damaged.</li> </ul>	○		○	○	○
<b>Front and rear suspension*</b>	<ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Correct if necessary.</li> </ul>			○		○

## PERIODIC MAINTENANCE/LUBRICATION INTERVALS



ITEM	ROUTINE	INITIAL			EVERY	
		1 month	3 months	6 months	6 months	1 year
<b>Steering system*</b>	<ul style="list-style-type: none"> <li>• Check operation.</li> <li>• Correct if damaged.</li> <li>• Check toe-in.</li> <li>• Adjust if necessary.</li> </ul>	○	○	○	○	○
<b>Steering shaft*</b>	<ul style="list-style-type: none"> <li>• Lubricate every 6 months.**</li> </ul>			○	○	○
<b>Fittings and Fasteners*</b>	<ul style="list-style-type: none"> <li>• Check all chassis fittings and fasteners.</li> <li>• Correct if necessary.</li> </ul>	○	○	○	○	○
<b>Battery*</b>	<ul style="list-style-type: none"> <li>• Check specific gravity.</li> <li>• Check that the breather hose is working properly.</li> <li>• Correct if necessary.</li> </ul>	○	○	○	○	○

\* It is recommended that these items be serviced by a Yamaha dealer.

\*\* Lithium-soap-based grease

### NOTE:

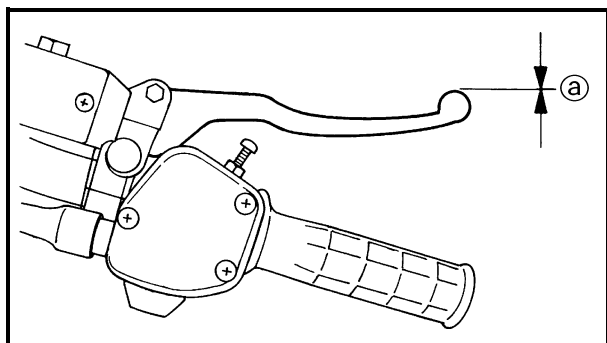
● Recommended brake fluid: DOT 4

● Brake fluid replacement:

1. When disassembling the master cylinder or caliper, replace the brake fluid. Normally check the brake fluid level and add fluid as required.

2. On the inner parts of the master cylinder and caliper, replace the oil seals every two years.

3. Replace the brake hoses every four years, or if cracked or damaged.



## CHASSIS

### ADJUSTING THE FRONT BRAKE

#### 1.Check:

- Brake lever free play ①  
Out of specification → Bleed the front brake system.  
Refer to "AIR BLEEDING (HYDRAULIC BRAKE SYSTEM)".  
(Manual No.: 4XE-F8197-11)



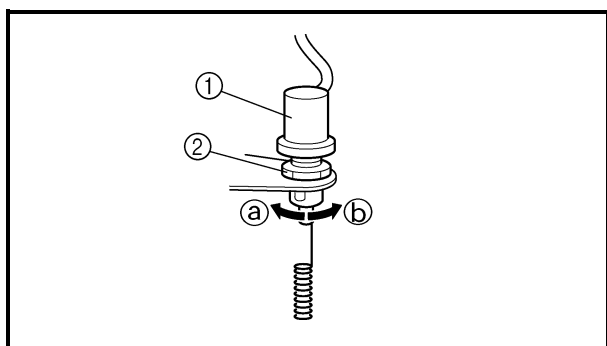
**Brake lever free play (at brake lever end):**  
**0 mm (0 in)**

### ADJUSTING THE REAR BRAKE LIGHT SWITCH

#### NOTE:

The rear brake light switch is operated by movement of the brake pedal.

The rear brake light switch is properly adjusted when the brake light comes on just before the braking effect starts.



#### 1.Check:

- Rear brake light operation timing  
Incorrect → Adjust.

#### 2.Adjust:

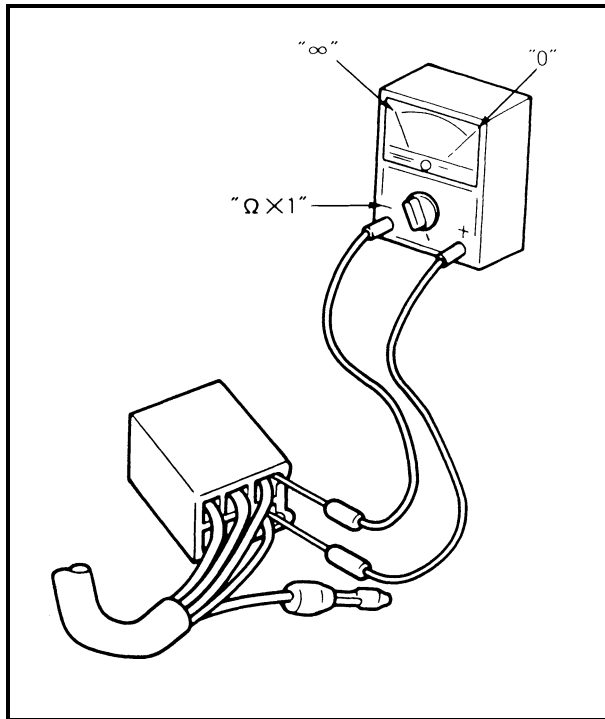
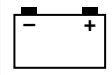
- Rear brake light operation timing

\*\*\*\*\*

- Hold the main body ① of the rear brake light switch so that it does not rotate and turn the adjusting nut ② in direction ① or ② until the rear brake light comes on at the proper time.

Direction ①	Brake light comes on sooner.
Direction ②	Brake light comes on later.

\*\*\*\*\*



## ELECTRICAL

### CHECKING THE SWITCH

#### CHECKING THE SWITCH

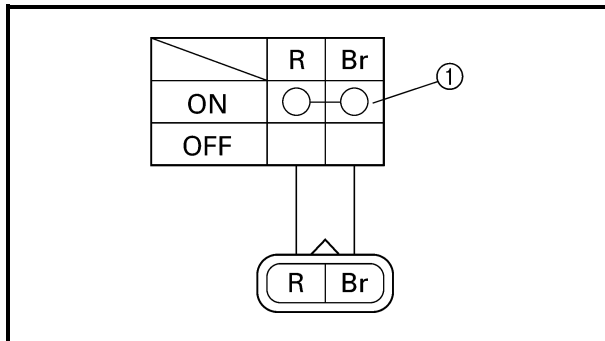
Use a pocket tester to check the terminals for continuity. If the continuity is faulty at any point, replace the switch.



**Pocket tester:**  
P/N. YU-03112, 90890-03112

#### NOTE:

- Set the pocket tester to “0” before starting the test.
- The pocket tester should be set to the “ $\Omega \times 1$ ” range when testing the switch for continuity.
- Turn the switch on and off a few times when checking it.



### CHECKING A SWITCH SHOWN IN THE MANUAL

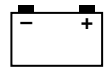
The terminal connections for switches (main switch, handlebar switch, engine stop switch, light switch, etc.) are shown in a chart similar to the one on the left.

This chart shows the switch positions in the column and the switch lead colors in the top row.

For each switch position, “○—○” indicates the terminals with continuity.

#### The example chart shows that:

- ① There is continuity between the “Red and Brown” leads when the switch is set to “ON”.

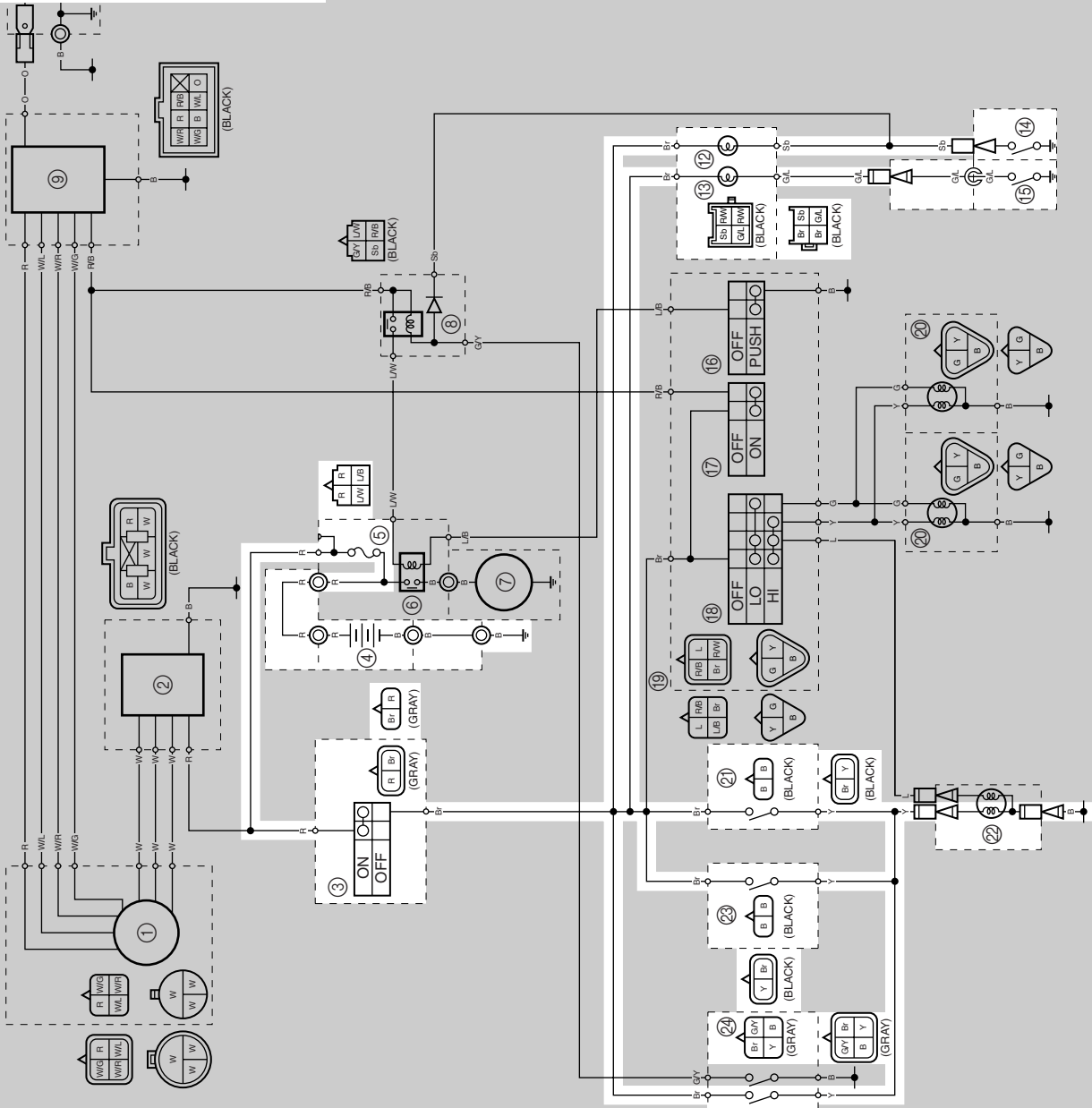


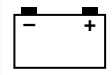
EB806000

# SIGNAL SYSTEM

## CIRCUIT DIAGRAM

- ③ Main switch
- ④ Battery
- ⑤ Fuse
- ⑫ Neutral indicator light
- ⑬ Reverse indicator light
- ⑭ Neutral switch
- ⑮ Reverse switch
- ⑰ Front brake light switch
- ⑱ Tail/brake light
- ⑲ Rear brake light switch
- ⑳ Rear brake lever switch





## CHECKING THE SIGNAL SYSTEM

1.If the tail/brake light fails to come on:

### 1.Bulb and bulb socket

- Check the bulb and bulb socket for continuity.



CONTINUITY

NO CONTINUITY



Replace the bulb and/or bulb socket.

### 2.Brake light switches

Refer to “CHECKING THE SWITCH”.



CONTINUITY

NO CONTINUITY

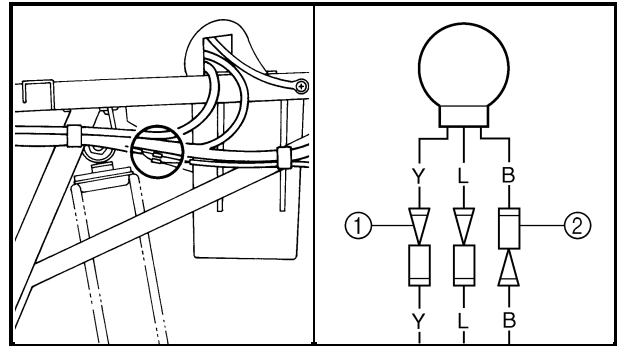


Replace the brake switch.

### 3.Voltage

- Connect the pocket tester (DC 20V) to the bulb socket connector.

**Tester (+) lead → Yellow terminal ①**  
**Tester (–) lead → Black terminal ②**



- Turn the main switch to “ON”.
- Check the voltage (12 V) of the “Yellow” lead on the bulb socket connector.



MEETS  
SPECIFICATION

OUT OF SPECIFICATION



The wiring circuit from the main switch to the bulb socket connector is faulty, repair it.

This circuit is not faulty.

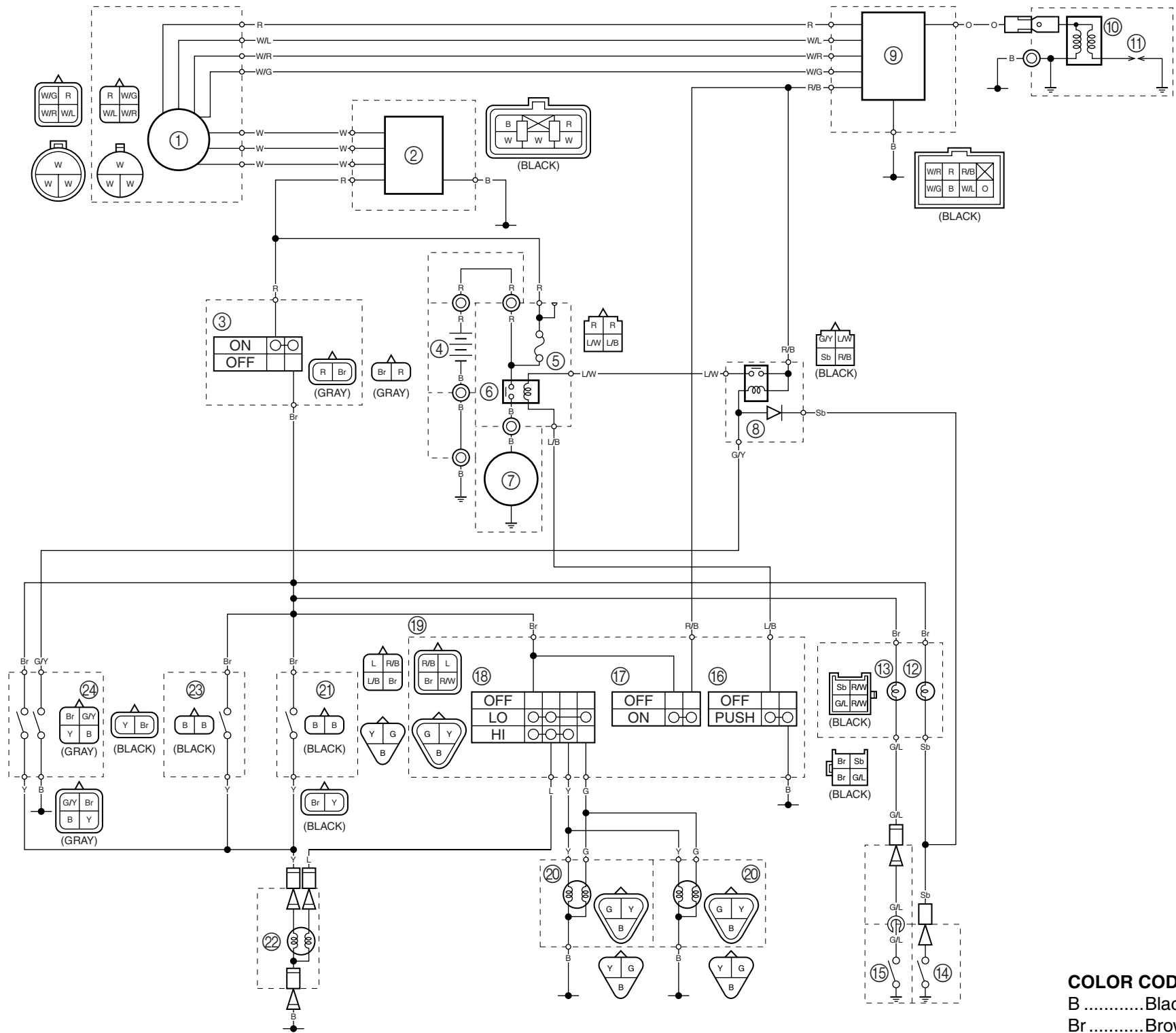




YAMAHA MOTOR CO., LTD.  
2500 SHINGAI IWATA SHIZUOKA JAPAN

PRINTED IN U.S.A.

YFM250XP WIRING DIAGRAM



- ① A.C. magneto
- ② Rectifier/regulator
- ③ Main switch
- ④ Battery
- ⑤ Fuse
- ⑥ Starter relay
- ⑦ Starter motor
- ⑧ Starting circuit cut-off relay
- ⑨ CDI unit
- ⑩ Ignition coil
- ⑪ Spark plug
- ⑫ Neutral indicator light
- ⑬ Reverse indicator light
- ⑭ Neutral switch
- ⑮ Reverse switch
- ⑯ Start switch
- ⑰ Engine stop switch
- ⑱ Lights switch
- ⑲ Handlebar switch
- ⑳ Headlight
- ㉑ Front brake light switch
- ㉒ Tail/brake light
- ㉓ Rear brake light switch
- ㉔ Rear brake lever switch

COLOR CODE

B .....Black  
Br .....Brown  
G .....Green  
L .....Blue  
O .....Orange  
R .....Red  
Sb .....Sky blue  
W .....White  
Y .....Yellow

G/L ..... Green/Blue  
G/Y ..... Green/Yellow  
L/B ..... Blue/Black  
L/W ..... Blue/White  
R/B ..... Red/Black  
R/W ..... Red/White  
W/G ..... White/Green  
W/L ..... White/Blue  
W/R ..... White/Red